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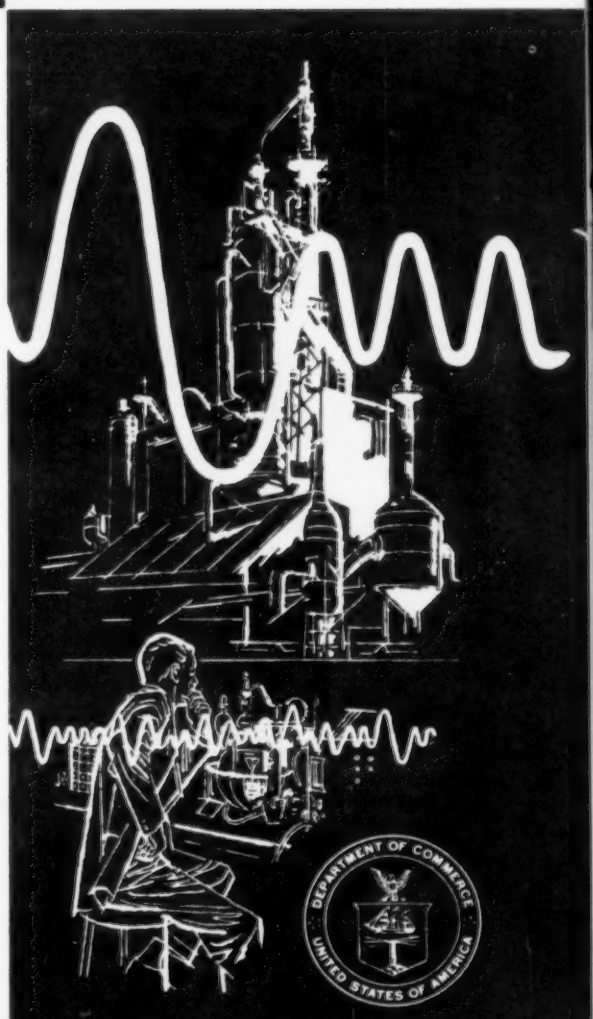

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A BATTERY OF AUDITORY TESTS WERE ADMINISTERED TO 27 PATIENTS WITH SENSORINEURAL HEARING LOSS AND ONCE TO 30 NORMAL LISTENERS. THE BATTERY INCLUDED CONVENTIONAL AIR- AND BONE-CONDUCTION AUDIOGRAMS; SPEECH THRESHOLD AND DISCRIMINATION TESTS; SEKESY AUDIOGRAMS FOR SWEEP AND FREQUENCY; AND TDT AND SISI TESTS. INDICES OF BOTH ABSOLUTE AND RELATIVE CONSISTENCY WERE COMPUTED FOR EACH MEASURE FROM THE TEST-RETEST DATA; AND WERE EVALUATED IN TERMS OF EFFICIENCY IN DIFFERENTIATING BETWEEN INDIVIDUALS WITH NORMAL HEARING AND THOSE WITH SENSORINEURAL HEARING LOSS.
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THE SAL (SENSORINEURAL ACUITY LEVEL) TEST AND CONVENTIONAL BONE CONDUCTION TESTS WERE ADMINISTERED TO SUBJECTS WITH CONDUCTIVE LOSS DUE TO OTOSCLEROSIS AND TO NORMAL SUBJECTS WITH SIMULATED UNILATERAL CONDUCTIVE HEARING LOSSES AND THE RESULTS COMPARED.
AD-287 092 DIV. 16

***AUDITORY PERCEPTION**

THE SAL (SENSORINEURAL ACUITY LEVEL) TEST AND CONVENTIONAL BONE CONDUCTION TESTS WERE ADMINISTERED TO SUBJECTS WITH CONDUCTIVE LOSS DUE TO OTOSCLEROSIS AND TO NORMAL SUBJECTS WITH SIMULATED UNILATERAL CONDUCTIVE HEARING LOSSES AND THE RESULTS COMPARED.
AD-287 092 DIV. 16

A REVIEW OF PSYCHOACOUSTICS RELATED TO DETECTION. POTENTIAL AREAS OF IMPROVEMENT IN DETECTION CAPABILITY. HUMAN AUDITORY CAPABILITY WITH REGARD TO SIGNAL DETECTION IN NOISY FIELDS.
AD-287 104 DIV. 28

***AUDITORY SIGNALS**

A REVIEW OF PSYCHOACOUSTICS RELATED TO DETECTION. POTENTIAL AREAS OF IMPROVEMENT IN DETECTION CAPABILITY. HUMAN AUDITORY CAPABILITY WITH REGARD TO SIGNAL DETECTION IN NOISY FIELDS.
AD-287 104 DIV. 28

***AUDITORY THRESHOLDS**

STUDIES ON TEMPORARY THRESHOLD SHIFT CAUSED BY HIGH INTENSITY ACOUSTIC TRANSIENTS.
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***AUDITORY THRESHOLDS**
ANALYSIS

A BATTERY OF AUDITORY TESTS WERE ADMINISTERED TO 27 PATIENTS WITH SENSORINEURAL HEARING LOSS

AND ONCE TO 30 NORMAL LISTENERS. THE BATTERY INCLUDED CONVENTIONAL AIR- AND BONE-CONDUCTION AUDIOGRAMS, SPEECH THRESHOLD AND DISCRIMINATION TESTS, BEKESY AUDIOGRAMS FOR SWEEP AND FREQUENCY, AND TDT AND SISI TESTS. INDICES OF BOTH ABSOLUTE AND RELATIVE CONSISTENCY WERE COMPUTED FOR EACH MEASURE FROM THE TEST-RETEST DATA, AND WERE EVALUATED IN TERMS OF EFFICIENCY IN DIFFERENTIATING BETWEEN INDIVIDUALS WITH NORMAL HEARING AND THOSE WITH SENSORINEURAL HEARING LOSS.
AD-287 070 DIV. 16

***AUTOMATIC PILOTS**

SELF-OSCILLATION OF AIRCRAFT WITH PULSE-ACTION SERVOMECHANISM AUTOPILOT; DYNAMIC ERROR OF AUTOMATIC LONGITUDINAL STABILIZATION OF A WINGED AIRCRAFT IN DISTURBED ATMOSPHERE. USSR TRANSLATION.
AD-287 722 DIV. 1

***AUTOMATIC PILOTS**
SERVO SYSTEMS

SUPPRESSION OF SELF-OSCILLATIONS IN A SERVO-PILOT SYSTEM. USSR TRANSLATION.
AD-287 721 DIV. 1

***AVIATION ACCIDENTS**

PREVENTION OF MID-AIR AIRCRAFT COLLISIONS BY A RADIO COMMUNICATION SYSTEM.
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***AVIATION MEDICINE**

TEST PILOTS WERE COMPARED WITH NONFLYERS IN THEIR ABILITY TO ESTIMATE A FUNCTION OF THE POSTURAL VERTICAL. AN ATTEMPT IS MADE TO MINIMIZE KINESTHETIC CUES AND AN ANALYSIS OF THE AVERAGE ERROR AND SLOPE FOR EACH DAY OF 3 DAILY SESSIONS WAS CONDUCTED.
AD-287 086 DIV. 16

***AXIAL-FLOW COMPRESSOR BLADES**

FATIGUE TESTS AND CRACK DETECTION ON SOME TYPES OF AXIAL FLOW COMPRESSOR ROTOR BLADES. DATA PROVIDED A GENERAL COMPARISON OF "AS-MANUFACTURED" ENDURANCE LIMITS AND WERE USED AS A VERIFICATION CONTROL IN EVALUATING A SUPPLEMENTARY METHOD OF DETECTING FAILED BLADES.
AD-287 410 DIV. 27

***AZO RADICALS**

HETEROLYTIC CONVERSION OF HEXAFLUOROHYDRAZOMETHANE CHEMICAL REACTIONS WITH OXIDIZING AND REDUCING AGENTS, AND NUCLEOPHILIC REAGENTS.
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***BACKWARD-WAVE OSCILLATORS**

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AD-287 141 DIV. 8

***BACTERIAL AEROSOLS**
IMPINGERS

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AD-287 770 DIV. 3

***BAND-PASS FILTERS**

DEVELOPMENT OF A LOW-NOISE C-BAND TWT AMPLIFIER WITH AN ELECTRICALLY-TUNABLE BANDPASS FILTER EMPLOYING YIG SPHERES.
AD-287 228 DIV. 8

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AD-287 012 DIV. 14

***BATTERY SEPARATORS**

HERMETICALLY SEALED NI-CD BATTERIES; CERAMIC-TO-METAL SEALS; SEPARATOR CHARACTERISTICS; STABILIZATION OF ELECTRODES; CELL UNIFORMITY.
AD-287 916 DIV. 7

***BEACHES**

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***BEAMS**

PROGRAMMED MANEUVER-SPECTRUM FATIGUE TESTS OF AIRCRAFT BEAM SPECIMENS. BENDING FATIGUE PROPERTIES OF A GROUP OF 7075-T6 AL ALLOY BEAM SPECIMENS WERE FOUND TO BE SIMILAR TO THOSE OF TYPICAL AIRCRAFT STRUCTURES. PRESTRESSING, PERIODIC SINGLE OVERSTRESSING AND PERIODIC REPEATED UNDERSTRESSING EFFECTS ARE DISCUSSED.
AD-287 986 DIV. 17

***BERYLLIUM**

MEASUREMENT OF THE ABSOLUTE PHOTOELECTRIC ABSORPTION CROSS SECTION FOR BE AT PHOTON ENERGIES SLIGHTLY GREATER THAN THE K-IONIZATION THRESHOLD ENERGY.
AD-287 490 DIV. 20

ANALYTICAL TEST METHODS FOR DETERMINING MINUTE AMOUNTS OF SELECTED ELEMENTS IN REI ELEMENTS; O, N, AL, B, CA, C, CR, CO, CU, FE, MG, MN, MO, NI, AND SI.
AD-287 634 DIV. 4

***BETA PARTICLES**

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STATUS OF KNOWLEDGE OF GROUND WATER CONTAMINANTS. INCLUDED ARE A SUMMARY, OUTLINE OF THE INVESTIGATION, LITERATURE SUMMARY, AND SUPPLEMENTAL INFORMATION ON SELECTED CONTAMINANTS. A BIBLIOGRAPHY IS INCLUDED.
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***BIOLOGICAL WARFARE AGENTS**

MARK II PARTICHROME PROCESSOR AND MARK III PARTICHROME SCANNER. AUTOMATIC STEPWISE COLLECTION AND STAINING OF AIRBORNE BACTERIA ON TRANSPARENT TAPE AS WELL AS AUTOMATIC SCANNING OF TRANSPARENT TAPES WITH CARBON PARTICLES AND STAINED ORGANISMS WITH AN ACCURACY OF 0.1% WAS DEMONSTRATED.
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***BIOLOGY**
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***BIOLOGY**
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***BODIES OF REVOLUTION**
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***BODY TEMPERATURE**

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***BOLTS**

SUMMARY OF THE 2ND AND 3RD TECHNICAL MEETINGS ON REFRACTORY METAL ALLOY STRUCTURAL FASTENERS; DISCUSSION OF THREAD FORMS AND COATINGS FOR THREADED NUTS AND BOLTS.
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***BOMBING**
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***BONDING**

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***BOROHYDRIDES**

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***BORON COMPOUNDS**

KINETIC DATA FOR THE DECOMPOSITION OF NONABORANE-15 AT 30C WERE OBTAINED MASS SPECTROMETRICALLY: OCTABORANE, HEXABORANE-10, AND PENTABORANE-9 DECOMPOSITION. PENTABORANE COUPLING REACTION WITH BRONZE CATALYST.
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***BOUNDARY LAYER**

A TRANSLATION ON THE DISTRIBUTION OF TEMPERATURE IN A HOLLOW INFINITE CYLINDER.
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***BRAIN**
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A BIBLIOGRAPHY OF CENTRAL NERVOUS SYSTEM MECHANISMS AND MODELS. RELATED APPLICATIONS INCLUDE BIONICS, CYBERNETICS, AND PHYSIOLOGICAL AND PSYCHOLOGICAL PROCESSES.
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***BRAIN**
NEUROMUSCULAR TRANSMISSION

SKELETAL MUSCLE RELAXANTS ACT BY DEPRESSING OR INTERRUPTING TRANSMISSION OF NERVE IMPULSES THROUGH POLYSYNAPTIC PATHWAYS. ZOXAZOLAMINE, MEPHENESIN, TETRAHYDROAMINO ACRIDINES (THA) AND PHYSOSTIGMINE SULFATE COMPOUNDS WERE TESTED. CNS EFFECT WAS STUDIED.
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***BRITTLE MATERIALS**

LIQUID METAL EMBRITTLEMENT OF A CU-2% BE ALLOY. PROPENSITY TOWARD BRITTLE FRACTURE IN THE PRESENCE OF A 2% NA AMALGAM WAS INVESTIGATED. RESULTS CORRELATED FRACTURE STRENGTH IN THE LIQUID METAL ENVIRONMENT WITH THERMAL-MECHANICAL HISTORY.
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***BUCKLING**

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***CABLE ASSEMBLIES**
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***CADMIUM COMPOUNDS**

ACTIVATION MECHANISM OF CDS SINGLE CRYSTALS IRRADIATED LOCALLY BY X-RAYS. ACTIVATION BY THE DIFFUSION OF DEFECT INTO THE NONIRRADIATED PORTION AND FILLING OF THE CRYSTAL VOLUME WITH RECOMBINATION CENTERS.
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***CALCIUM**
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DETERMINATION AS TO WHETHER (1) DIETARY CALCIUM REQUIREMENTS ARE INCREASED DUE TO CALCIUM LOSSES IN SWEAT DURING PROFUSE SWEATING CONDITIONS; (2) CALCIUM CONCENTRATION IN THE SWEAT IS A REFLECTION OF THE INTAKE; AND (3) CALCIUM EXCRETION DURING EXERCISE IS HIGHER IN THE HEAT OR IN A TEMPERATE ENVIRONMENT.
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***CALIBRATION**

RESULTS OF AN ENERGY RESPONSE OF LANDSWERK POCKET CHAMBERS USING MONOENERGETIC GAMMA-EMITTING RADIOISOTOPES.
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PRESSURE DISTRIBUTION IN OPPOSED ANVIL CONFIGURATIONS. EMPHASIS IN THIS STUDY WAS PLACED ON CALIBRATION OF SAMPLE WAFERS MADE OF POWDER PRE-PELLETED INTO A METAL-CONTAINING RING. VARIABLES INCLUDED DIAMETER TO THICKNESS RATIO OF THE SAMPLE, SIZE AND MECHANICAL PROPERTIES OF THE RINGS, MECHANICAL PROPERTIES OF THE PRESSURE TRANSMITTING MEDIUM, TEMPERATURE.
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***CALIBRATION**
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***CAMERA TUBES**

A COMPARISON OF IMAGE ORITHICONS AND IMAGE ISOCONS. IMAGE ISOCON PROVIDED OUTPUT SIGNAL OF HIGHER AMPLITUDE AND LESS NOISE CONTENT.
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***CAMERA TUBES**
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***CANCER**

FOUR STRAINS OF MICE ARE BEING FED A MIXTURE OF IRRADIATED FOODS FOR THE DURATION OF THEIR LIVES TO DETERMINE WHETHER FOODS STERILIZED BY IRRADIATION ARE LIKELY TO BE CARCINOGENIC. TO DATE, HISTOPATHOLOGICAL EXAMINATIONS HAVE REVEALED NO INDICATIONS OF A SIGNIFICANT INCREASE IN TUMOR INCIDENCE.
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***CARBON DIOXIDE**

VISCOSITY OF SEVERAL GASES BY OSCILLATING DISK METHOD. MEASUREMENTS OF A= CO2, HE, NE AND A VISCOSITY BETWEEN 25 - 270 C AND PRESSURES OF 1 - 150 ATM. EMPIRICAL CORRELATIONS AND CORRELATIONS BASED ON A LENNARD-JONES 6-12 AND BUCKINGHAM EXP - 6 POTENTIAL ARE PRESENTED.
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***CARBON DIOXIDE**
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***CARBONIC ANHYDRASE**
INHIBITION

THE ADDITIVE EFFECT OF A CARBONIC ANHYDRASE INHIBITOR, ACETAZOLAMIDE, AND THE INTRAVENOUS INFUSION OF FAT EMULSION ON THE DIFFERENCE BETWEEN THE ALVEOLAR AND ARTERIAL CARBON DIOXIDE TENSION STRONGLY SUGGESTS THAT FAT EMULSION DOES NOT EXERT ITS EFFECT BY INTERFERENCE WITH THE INTERCONVERSION OF CO2 AND BICARBONATE.
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***CARGO VEHICLES**

KIT, OFF-ROAD CONVERSION, M52-127 TRUCK TRACTOR SEMITRAILER COMBINATION EVALUATION.
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STRESS-RUPTURE TESTING OF CAST NICKEL ALLOYS AT 800 DEGREES, HIGH HEAT RESISTANCE IS OF INTEREST IN VIEW OF LONGER SERVICE PERIODS THAN THOSE REQUIRED IN AVIATION.
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***CATALYSTS**

SLOW FLOW OF A DISSOCIATED GAS ABOUT A CATALYTIC PROBE. A TECHNIQUE FOR MEASURING CATALYTIC EFFICIENCIES OF SURFACES AND DIFFUSION COEFFICIENTS OF A DISSOCIATED GAS.
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***CATAPULTS**

EVALUATION OF AND AIRCRAFT CATAPULT HOOKS, WIRE ROPE BRIDLE AND TENSION BAR RETAINER.
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***CATHODIC PROTECTION**

CORROSION PROTECTIVE SYSTEM FOR THE PRESSURIZED CABIN SECTION OF THE MODEL 22 FIREFLY. HYDROSTATIC TESTING, CATHODIC PROTECTION, STEEL TEST TANKS.
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***CERAMIC CAPACITORS**
PRODUCTION

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***CERAMIC FIBERS**

GLASS FIBER STRENGTH ENHANCEMENT THROUGH BUNDLE DRAWING. EXPERIMENTAL EVIDENCE OF THE STRENGTH-SIZE RELATIONSHIP IN GLASS FIBERS AND ANALYSIS PREDICTING THE INTERRELATIONSHIPS BETWEEN VARIABLES FOR GLASS FIBERS DRAWN FROM RODS. FEASIBILITY OF DRAWING VERY FINE GLASS FILAMENTS WITHIN BUNDLE DRAWN FIBERS.
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***CERAMIC MATERIALS**

REPORTS PRESENTED AT THE SIXTH REFRACTORY COMPOSITES WORKING GROUP MEETING IN DAYTON, JUNE 1962. PROTECTIVE COATINGS, INSULATING CERAMICS, DISPERSION STRENGTHENING, PLASMA SPRAYING, HIGH TEMPERATURE REACTIONS, AND TESTING TECHNIQUES.
AD-287 029 DIV. 14

CERAMIC DIELECTRICS. UTILIZATION OF THE DEVITRIFICATION PROCESS FOR FERROELECTRIC CERAMICS. ELECTRICAL PROPERTIES OF BODIES PRODUCED BY DEVITRIFICATION OF GLASS FRITS CONTAINING 91 PARTS OF BATIO3 AND 9 PARTS OF B203 AND IMPURITIES. MECHANICAL PROPERTIES OF MICROMODULE PAPERS (96-96% AL203).
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***CERAMIC MATERIALS**
ELECTRICAL PROPERTIES

A STUDY OF THE ATTENUATION PROPERTIES OF CERAMIC MATERIALS OVER 100 TO 12,000 MC/SEC AND FROM ROOM TEMPERATURE TO 2300F TO OBTAIN INFORMATION FOR DESIGNING ABSORBERS.
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***CERAMIC MATERIALS**
INSULATING MATERIALS

MECHANICAL, PHYSICAL, AND ELECTRICAL PROPERTIES OF VARIOUS CERAMIC DIELECTRIC MATERIALS: PARTIAL REPLACEMENT OF SILICON DIOXIDE IN SPODUMENE BY BORON TRIOXIDE, GERMANIUM OXIDE, OR TITANIUM DIOXIDE; MODIFICATION OF BORON NITRIDE AND BARIUM TITANATE GLASS.
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AD-287 167 DIV. 14

PROPERTIES OF CERAMIC DIELECTRIC MATERIALS FOR POSSIBLE USE IN MICROWAVE EQUIPMENT; CRYSTAL FORMATION AND METHODS OF PREPARATION OF GLASS CONTAINING THESE MATERIALS; MECHANICAL AND ELECTRICAL PROPERTIES.
AD-287 168 DIV. 14

MECHANICAL, PHYSICAL, AND ELECTRICAL PROPERTIES OF VARIOUS CERAMIC DIELECTRIC MATERIALS; PARTIAL REPLACEMENT OF SILICON DIOXIDE IN SPODUMENE BY TITANIUM DIOXIDE; MODIFICATION OF BORON NITRIDE AND BARIUM TITANATE GLASS.
AD-287 172 DIV. 14

***CERAMIC MATERIALS**
MANUFACTURING METHODS

MANUFACTURING METHODS FOR LARGE SCALE PRODUCTION OF HIGH PURITY FERROELECTRIC OR PIEZOELECTRIC CERAMIC MATERIALS FOR ELECTRONIC APPLICATIONS. BARIUM TITANATES, ZIRCONATES, NIOBATES, AND TANTALATES.
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***CERAMIC MATERIALS**
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BIBLIOGRAPHY OF CPE'S RUSSIAN LITERATURE ON SILICON AND SILICON CARBIDE; OCCASIONAL REFERENCES TO WORK ON OTHER ELEMENTS, CHIEFLY GERMANIUM.
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***CERENKOV RADIATION**

RADIATION FROM A LINE SOURCE IN A UNIAXIALLY ANISOTROPIC PLASMA.
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AD-286 910 DIV. 25

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CHEMICAL IMPURITIES

ANALYTICAL TEST METHODS FOR DETERMINING MINUTE AMOUNTS OF SELECTED ELEMENTS IN BE: ELEMENTS: O, W, AL, B, CA, C, CR, CO, CU, FE, MG, MN, MO, NI, AND SI.
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CHEMICAL REACTIONS
BIBLIOGRAPHY

LIST OF PUBLISHED PAPERS AND UNPUBLISHED REPORTS RESULTING FROM THEORETICAL STUDIES AT THE UNIVERSITY OF CINCINNATI ON CHEMICAL REACTIVITY OF ORGANIC COMPOUNDS AS RELATED TO STRUCTURE.
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CHEMICAL WARFARE AGENTS

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SYMPOSIA

SYMPOSIA EARTH SATELLITE CONTROL AND CONTROL SYSTEMS, CONTROL OF MANNED SPACE ENVIRONMENT, SIMULATION, COMMUNICATIONS.
AD-287 937 DIV. 12

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***CONVEYORS**

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***COPPER**

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***CORROSION INHIBITION**

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***CORROSION INHIBITION**
COATINGS

A TRANSLATION OF SELECTED ARTICLES ON PLASTICS AND RESINS FROM THE RUSSIAN PERIODICAL SUDOSTROYENIYE (SHIPBUILDING).
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***CORTICOSTEROIDS**

THE ANTICIPATORY RESPONSE IN IMPACTION PATIENTS REFLECTED BY HIGHER PREOPERATIVE SERUM STEROID LEVELS, THE MAGNITUDE AND DURATION OF CORTICAL STIMULUS, IF PRESENT, SUFFICIENT TO PRODUCE ALTERATIONS IN URINARY 17 HYDROXYCORTICOSTEROID (17-OHCS) EXCRETION RATES, POTENTIAL OF DETECTION OF STEROID LEVELS BY DIRECT EFFORT OF IMPACTION SURGERY.
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***COSMIC RAY TELESCOPES**

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***COSMIC RAYS**

UNIQUENESS PROBLEMS IN THE MATHEMATICS OF MULTIPLE SCATTERING. SOME RECENT MATHEMATICAL STUDIES CONCERNING THE UNIQUENESS OF SOLUTIONS TO CHANDRASEKHAR'S MATHEMATICAL FORMULATION OF PRINCIPLES OF INVARIANCE IN THE THEORY OF RADIATIVE TRANSFER.
AD-287 114 DIV. 15

YIELD AND ANGULAR DISTRIBUTION OF CERENKOV RADIATION FROM EXTENSIVE AIR SHOWERS.
AD-287 427 DIV. 25

HIGH ENERGY INTERACTIONS OF COSMIC RAY PARTICLES ARE DISCUSSED. NUCLEAR EVENTS INDUCED BY HEAVY PRIMARIES AND THEORY OF MESON PRODUCTION IN HIGH ENERGY COLLISIONS ARE STUDIED.
AD-287 860 DIV. 20

THE SPACE RADIATION GUIDE IS PRESENTED TO PROVIDE FACTUAL DATA CURRENTLY KNOWN AND TO POINT OUT AREAS WHERE INFORMATION IS SKETCHY AND INCONCLUSIVE. COSMIC RAYS, SOLAR RADIATION AND THE GEOMAGNETICALLY TRAPPED RADIATIONS. INSTRUMENTS FOR MEASURING THESE RADIATIONS, SHIELDING TECHNIQUES, AND BIOLOGICAL EFFECTS.
AD-287 863 DIV. 32

***COSMIC RAYS**
DATA

STANDARD ERRORS OF COSMIC RAY DATA CORRECTED FOR ATMOSPHERIC EFFECTS.
AD-287 867 DIV. 2

***CREEP**

A CREEP BENDING ANALYSIS OF COMPRESSIBLE CIRCULAR PLATES. SOLUTIONS FOR MOMENTS AND DEFLECTION ARE PRESENTED FOR CLAMPED EDGE CIRCULAR PLATES UNDER UNIFORMLY DISTRIBUTED LOADS.
AD-287 042 DIV. 25

ULTRA-SHORT TIME CREEP RUPTURE. THE PRIMARY OBJECTIVE OF THIS PROGRAM WAS EXPANSION AND OPTIMIZATION OF ULTRA SHORT TIME CREEP TEST EQUIPMENT FOR TESTING REFRACTORY MATERIALS. A SERIES OF TESTS WAS MADE ON SHEET SAMPLES OF TA-10W.
AD-287 528 DIV. 17

***CRIMINOLOGY**
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REVIEWS THE BASIC DILEMMA BEHIND THE INADEQUACIES OF MUCH OF TODAY'S CORRECTIONAL RESEARCH AND AN EXPLANATION OF HOW THE USAFOTH RETRAINING GROUP IS PLANNING ITS RESEARCH METHODOLOGIES TO COPE WITH THIS PROBLEM.
AD-287 764 DIV. 32

***CRUCIFORM WINGS**

SECOND ORDER SOLUTION FOR SUPERSONIC FLOW OVER CRUCIFORM WINGS.
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***CRUSTACEA**
REPRODUCTION

EXAMINATION IN THE FIELD OF THOSE PROBLEMS RAISED BY LABORATORY WORK ON THE LARVAL DEVELOPMENT OF RHITHROPANOPEUS HARRISII (CRAB). ENCOMPASSES A DESCRIPTION OF THE LARVAE, CULTURING LARVAE UNDER VARYING ENVIRONMENTAL CONDITIONS, AND FIELD STUDIES INCLUDING HABITAT, ESTIMATES OF WATER MOVEMENT AND PLANKTON COLLECTIONS.
AD-287 154 DIV. 16

***CRYOGENICS**

VACUUM PUMPING BY CRYOSORPTION. A METHOD OF MEASURING AND ANALYZING THE VARIATION IN THE RATE OF ABSORPTION BY ACTIVATED CHARCOAL AT 77K FOR CONTINUOUS INFLOW OF NITROGEN GAS. A SET OF ABSORPTION PARAMETERS FOR ANALYSIS AND AN EQUATION WHICH DESCRIBES PRESSURE IN A CHAMBER DURING CONTINUOUS ABSORPTION.
AD-287 182 DIV. 30

***CRYSTAL FILTERS**

CRYSTAL FILTER TEST SET, HIGH FREQUENCY CRYSTAL FILTER TESTING IN THE RANGE 4.5-300 MC, COMPRESSION GAIN AMPLIFIERS DC OUTPUT VOLTAGE PROPORTIONAL TO AC INPUT AND COMPRESSION RATE, INSTRUMENTATION DESCRIBED.
AD-287 800 DIV. 8

***CRYSTAL MIXERS**

MIXER ACTION AND ITS INFLUENCE ON INTERFERENCE AND FREQUENCY ASSIGNMENTS.
AD-287 590 DIV. 8

***CRYSTAL OSCILLATORS**

EFFECTS OF EXTERNAL FORCES ON VIBRATING CRYSTAL PLATES. FLEXURAL STRESS EFFECTS IN THE VIBRATION OF QUARTZ PIEZOIDS WERE STUDIED. PERTURBATION METHODS WERE EMPLOYED IN THE ANALYSIS WITH A PROMISING DEGREE OF SUCCESS.
AD-287 487 DIV. 25

***CRYSTAL STRUCTURE**

COLD REGIONS SCIENCE AND ENGINEERING. PART II, PHYSICAL SCIENCE. SECTION B, THE PHYSICS AND MECHANICS OF SNOW AS A MATERIAL.
AD-287 052 DIV. 2

A SIMPLE FRACTIONAL CREAMING METHOD FOR DETERMINING THE MASS AND NUMBER PARTICLE SIZE DISTRIBUTION OF VARIOUS ACRYLATE-AMIDE LATTICES, PARTICLE SIZE ANALYSES.
AD-287 798 DIV. 14

***CRYSTAL STRUCTURE**
CERAMIC MATERIALS

PROPERTIES OF CERAMIC DIELECTRIC MATERIALS FOR POSSIBLE USE IN MICROWAVE EQUIPMENT. DEVITRIFICATION, CRYSTAL FORMATION, AND METHODS OF PREPARATION OF GLASS CONTAINING THESE MATERIALS, MECHANICAL AND ELECTRICAL PROPERTIES.
AD-287 187 DIV. 14

PROPERTIES OF CERAMIC DIELECTRIC MATERIALS FOR POSSIBLE USE IN MICROWAVE EQUIPMENT, CRYSTAL FORMATION AND METHODS OF PREPARATION OF GLASS CONTAINING THESE MATERIALS, MECHANICAL AND ELECTRICAL PROPERTIES.
AD-287 188 DIV. 14

***CRYSTAL STRUCTURE**
ELECTRICAL PROPERTIES

ELECTRON REDUCTION RATE AND HOLE PRODUCTION RATE WERE TWO-FOLD GREATER IN DEUTERON AND PROTON IRRADIATED DENDRITIC GE CRYSTALS THAN IN

ORDINARY GE CRYSTALS. THE DEMONSTRATION OF MAKING ELECTRONIC DEVICES BY A RADIATION PROCESS IS GIVEN.
AD-287 146 DIV. 25

*CRYSTALS

ELECTRONS AND HOLES WERE PRODUCED IN MIXED CRYSTALS OF KCL-KBR AND KCL-RBCL SOLID SOLUTION SYSTEMS BY IRRADIATION WITH 3-MEV ELECTRONS AT -190, -10, AND 20 C WITH DOSES OF 10 TO THE 6TH POWER RADS.
AD-286 982 DIV. 25

COLD REGIONS SCIENCE AND ENGINEERING. PART II. PHYSICAL SCIENCE. SECTION B. THE PHYSICS AND MECHANICS OF SNOW AS A MATERIAL.
AD-287 052 DIV. 2

*CRYSTALS
DIELECTRICS

INSULATION RESEARCH. TOPICS INCLUDE HIGH-DIELECTRIC-CONSTANT MATERIALS; HIGH-TEMPERATURE DIELECTRICS; BREAKDOWN; FIELD EMISSION; DIELECTRIC AND ELASTIC SPECTROSCOPY; CRYSTAL PHYSICS; MAGNETICS; MATHEMATICAL CRYSTALLOGRAPHY; MAGNETIC SPECTROSCOPY; OPTICAL MODULATION.
AD-286 981 DIV. 25

*CRYSTALS
HIGH PRESSURE RESEARCH

PRESSURE DISTRIBUTION IN OPPOSED ANVIL CONFIGURATIONS. EMPHASIS IN THIS STUDY WAS PLACED ON CALIBRATION OF SAMPLE BAKERS MADE OF POWDER PRE-PELLETED INTO A METAL-CONTAINING RING. VARIABLES INCLUDED DIAMETER TO THICKNESS RATIO OF THE SAMPLE, SIZE AND MECHANICAL PROPERTIES OF THE RINGS, MECHANICAL PROPERTIES OF THE PRESSURE TRANSMITTING MEDIUM; TEMPERATURE.
AD-287 560 DIV. 30

*CRYSTALS
INFRARED RADIATION

WORK WAS CONFINED TO REVISION OF THE SPECTROMETER AND THE INDEX OF REFRACTION AND THE EXTINCTION COEFFICIENT OF CRYSTALS; THE DATA OBTAINED IS NOT LISTED.
AD-287 567 DIV. 25

*CRYSTALS
REFRACTIVE PROPERTIES

DEVELOPMENT OF RAPID CLOSURE ELECTRO-OPTICAL CRYSTAL SHUTTER FOR PROTECTION OF PERSONNEL FROM FLASH BLINDNESS.
AD-287 896 DIV. 25

*CURVED PROFILES

INCREASING THE EFFICIENCY OF A DIFFUSER BY INSTALLING ESPECIALLY DESIGNED CROSS-RIBBING ON ITS WALLS; DIFFUSERS WITH RECTILINEAR GENERATRICES AND FOR RE NUMBERS LESS THAN 10 TO THE 5TH POWER.
AD-287 667 DIV. 9

*CYLINDRICAL BODIES

FORCED VIBRATIONS OF AN ELASTIC CIRCULAR BODY OF FINITE LENGTH SUBMERGED IN AN ACOUSTIC FLUID. PRESSURE AND VELOCITY FIELDS WHICH ARE PRODUCED IN THE FLUID BY HARMONIC EXCITATION OF AN ELASTIC CIRCULAR CYLINDRICAL BODY ARE EVALUATED. A POTENTIAL THEORY IS USED.
AD-286 905 DIV. 9

PERIODIC CYLINDER ARRAYS AS TRANSMISSION LINES. BY MEANS OF A RELATIVELY SIMPLE MATCHING NETWORK, EXCITATION OF A SURFACE-WAVE WAS OBTAINED ON THE PERIODIC LINE.
AD-286 973 DIV. 8

A CREEP BENDING ANALYSIS OF COMPRESSIBLE CIRCULAR PLATES. SOLUTIONS FOR MOMENTS AND DEFLECTION ARE PRESENTED FOR CLAMPED EDGE CIRCULAR PLATES UNDER UNIFORMLY DISTRIBUTED LOADS.
AD-287 042 DIV. 25

INCREASING THE EFFICIENCY OF A DIFFUSER BY INSTALLING ESPECIALLY DESIGNED CROSS-RIBBING ON ITS WALLS; DIFFUSERS WITH RECTILINEAR GENERATRICES AND FOR RE NUMBERS LESS THAN 10 TO THE 5TH POWER.
AD-287 667 DIV. 9

*DAMPING

DAMPING PROPERTIES OF A PLASTIC COATING (GRAPHITE FILLED COPOLYMER OF VINYL-CHLORIDE AND VINYL-ACETATE) UTILIZED IN DAMPING TREATMENTS FOR NEW CONSTRUCTION SUBMARINES AND SHIP HULLS.
AD-287 844 DIV. 14

*DATA
CALIBRATION

ANVERS-16 RADAR DATA CALIBRATION TECHNIQUES AT WHITE SANDS MISSILE RANGE.
AD-287 413 DIV. 6

*DATA PROCESSING SYSTEMS

INSTRUMENTAL SEISMOLOGY; NUMERICAL ANALYSIS AND DATA HANDLING; SOURCE MECHANISM DETERMINATION; EPICENTER DETERMINATION; WAKE PROPAGATION; DIAGNOSTIC AID FOR IDENTIFYING EARTHQUAKES AND EXPLOSIONS.
AD-287 624 DIV. 2

ACTIVITY REPORT ON AIRPORT FACILITY INCLUDING TRAFFIC CONTROL; DISPLAY SYSTEMS; LIGHTING; COMMUNICATION; LANDING SYSTEMS.
AD-287 658 DIV. 1

*DATA TRANSMISSION SYSTEMS

A MULTIPURPOSE RECEIVER DESIGNED TO MEET REQUIREMENTS OF SATELLITE TRACKING STATIONS FOR SPACE PROGRAMS THROUGH 1970. FREQUENCY BANDS OF 100 MC TO 10 KMC.
AD-286 985 DIV. 5

OBSERVATIONS PREPARED AT TIME OF LAUNCHING OF FIRST SATELLITE ON DATA EXPECTED TO BE OBTAINABLE.
AD-287 669 DIV. 2

DESIGN OF A PHASE MODULATOR-DEMODULATOR CAPABLE OF DIGITAL DATA TRANSMISSION OVER TYPICALLY MILITARY AUDIO COMMUNICATIONS SYSTEMS AT RATES OF 1200, 600, 300 AND 150 BITS PER SECOND.
AD-287 895 DIV. 30

*DEAFNESS

STUDIES OF TEMPORARY THRESHOLD SHIFT CAUSED BY HIGH INTENSITY ACOUSTIC TRANSIENTS.
AD-287 810 DIV. 16

*DECISION MAKING

ADAPTIVE DECISION PROCESSES ARE DESCRIBED MATHEMATICALLY.
AD-287 480 DIV. 15

*DECOMPOSITION

KINETIC DATA FOR THE DECOMPOSITION OF NONABORANE-15 AT 30C WERE OBTAINED MASS SPECTROMETRICALLY; OCTABORANE, HEXABORANE-10, AND PENTABORANE-9 DECOMPOSITION; PENTABORANE COUPLING REACTIONS WITH BRONZE CATALYST.
AD-287 496 DIV. 4

*DECOMPRESSION SICKNESS

A METHOD FOR THE QUANTITATIVE DETERMINATION OF GASEOUS TISSUE NITROGEN IS DESCRIBED AND THE NITROGEN CONTENT OF VARIOUS TISSUES OF RATS BREATHING 100% OXYGEN FOR VARIOUS PERIODS AND OF RATS SUBJECTED TO ELEVATED AIR PRESSURES UP TO 4 ATMOSPHERES IS REPORTED.
AD-287 508 DIV. 16

*DEFLECTION

LOAD DEFLECTION CHARACTERISTICS OF FAB 264 (LAYERED CLOTH IMPREGNATED WITH RUBBER) AT ROOM TEMPERATURE AND 0 F.
AD-287 824 DIV. 14

*DENTAL CARIES
MILITARY PERSONNEL

A DISCUSSION OF THOSE FACTORS WHICH COULD BE SHOWN TO BE ASSOCIATED WITH THE PERIODONTAL CONDITION OF NEW NAVAL RECRUITS. SIGNIFICANT DIFFERENCES WERE NOTED BETWEEN HIGH SCHOOL GRADUATES AND NONGRADUATES, INDICATING THE LEVEL OF HOME AND PROFESSIONAL DENTAL CARE.
AD-287 191 DIV. 16

*DENTAL EQUIPMENT

A CLINICAL EVALUATION OF THE HIGHER RPM SPEED TECHNICS (AIR TURBINE) IN THE REMOVAL OF IMPACTED TEETH WAS CARRIED OUT ON 100 MANDIBULAR THIRD MOLAR CASES. BODY FLUID 17-HYDROXYCORTICOSTEROID DETERMINATIONS WERE UTILIZED AS AN OBJECTIVE MEASUREMENT OF PATIENT RESPONSE TO STRESS INDUCED BY THE TWO ORAL SURGERY TECHNICS.
AD-287 084 DIV. 16

THE CHISEL AND AIR TURBINE TECHNICS WERE COMBINED FOR REMOVAL OF IMPACTED MANDIBULAR THIRD MOLARS. THE BASIC STEPS ARE AS FOLLOWS: TO REMOVE BONE WITH THE AIR TURBINE; TO LIMIT USE OF THE MALLET AND CHISEL TO A SINGLE SPLIT AND TO USE THE AIR TURBINE FOR ADDITIONAL SECTIONING OF TOOTH; BEFORE TOOTH IS SPLIT, TO REMOVE BONE ADJACENT TO CORONAL ELEMENT TO BE SECTIONED; TO USE CARBIDE BUR ON DENTIN AND TO USE A DIAMOND STONE ONLY WHEN DIVIDING TOOTH INVOLVING LARGE SEGMENTS OF ENAMEL.
AD-287 089 DIV. 16

*DENTAL RESEARCH

THE IN VITRO EFFECTIVENESS OF STANNOUS FLUORIDE PROPHYLACTIC DENTAL PASTES WAS DETERMINED BY MEASURING THE AMOUNT OF PHOSPHORUS REMOVED BY LACTIC ACID FROM TREATED AND UNTREATED TOOTH ENAMEL SURFACES.
AD-287 091 DIV. 16

THIOCYANATE WAS IDENTIFIED AS THE SALIVARY FACTOR PRODUCING THE ABSORBANCE MAXIMUM OBSERVED AT 4.9 MICRONS. IT WAS NOT NOTICEABLY ASSOCIATED WITH THE PRESENCE OR ABSENCE OF DENTAL CARIES.
AD-287 193 DIV. 16

*DENTAL SURGERY

THE ANTICIPATORY RESPONSE IN IMPACTION PATIENTS REFLECTED BY HIGHER PREOPERATIVE SERUM STEROID LEVELS; THE MAGNITUDE AND DURATION OF CORTICAL STIMULUS, IF PRESENT, SUFFICIENT TO PRODUCE ALTERATIONS IN URINARY 17 HYDROXYCORTICOSTEROID (17-OHCS) EXCRETION RATES; POTENTIAL OF DETECTION OF STEROID LEVELS BY DIRECT EFFORT OF IMPACTION SURGERY.
AD-287 079 DIV. 16

A CLINICAL EVALUATION OF THE HIGHER RPM SPEED TECHNICS (AIR TURBINE) IN THE REMOVAL OF IMPACTED TEETH WAS CARRIED OUT ON 100 MANDIBULAR THIRD MOLAR CASES. BODY FLUID 17-HYDROXYCORTICOSTEROID DETERMINATIONS WERE UTILIZED AS AN OBJECTIVE MEASUREMENT OF PATIENT RESPONSE TO STRESS INDUCED BY THE TWO ORAL SURGERY TECHNICS.
AD-287 084 DIV. 16

*DETECTION

DEMODULATION OF A SIGNAL FROM A SPECIAL GENERATOR AND A SPECIAL CLASS OF TRANSDUCERS.
AD-287 483 DIV. 8

*DETECTION
HEARING

A REVIEW OF PSYCHOACOUSTICS RELATED TO DETECTION. POTENTIAL AREAS OF IMPROVEMENT IN DETECTION CAPABILITY. HUMAN AUDITORY CAPABILITY WITH REGARD TO SIGNAL DETECTION IN NOISY FIELDS.
AD-287 104 DIV. 28

*DETECTORS

THE FEASIBILITY OF USING AN ISOTHERMAL TWO-PHASE SYSTEM FOR THERMAL IMAGING DETECTION.
AD-287 748 DIV. 8

A SURVEY OF ISOTHERMAL IMAGING METHODS IS PRESENTED.
AD-287 748 DIV. 8

*DETERGENTS

A SURVEY OF SIX WIDELY DISPERSED STATES FOR WATER POLLUTION STUDIES. ANALYSIS OF 139 WATER SAMPLES REVEALED A RANGE IN ANIONIC SURFACTANT CONTENT (ABS ALKYL BENZENE SULFONATE) FROM 0.0 TO 0.1 PARTS PER MILLION. LAB ANALYSIS ALSO INCLUDED BICARBONATE, NITRATE, PHOSPHATE, SPECIFIC CONDUCTANCE AND PH DETERMINATIONS.
AD-286 950 DIV. 18

*DETERMINANTS

CHARACTERISTIC IMPEDANCE OF RECTANGULAR COAXIAL TRANSMISSION LINES. THE CORNER CAPACITANCE.
AD-287 555 DIV. 8

*DEUTERON BOMBARDMENT

ELECTRON REDUCTION RATE AND HOLE PRODUCTION RATE WERE TWO-FOLD GREATER IN DEUTERON AND PROTON IRRADIATED DENDRITIC GE CRYSTALS THAN IN ORDINARY GE CRYSTALS. THE DEMONSTRATION OF MAKING ELECTRONIC DEVICES BY A RADIATION PROCESS IS GIVEN.
AD-287 146 DIV. 25

*DIELECTRIC FILMS

THIN ANODIZED TANTALUM FILM CAPACITORS WERE FABRICATED. THE GLOW DISCHARGE METHOD OF DEPOSITING THIN DIELECTRIC FILMS WAS STUDIED.
AD-287 680 DIV. 8

*DIELECTRIC PROPERTIES

THE DESIGN OF A SHOCK AND VIBRATION EXCITER DRIVEN BY HYDRAULIC POWER IS DISCUSSED.
AD-287 868 DIV. 29

*DIELECTRICS

CERAMIC DIELECTRICS. UTILIZATION OF THE DEVITRIFICATION PROCESS FOR FERROELECTRIC CERAMICS. ELECTRICAL PROPERTIES OF BODIES PRODUCED BY DEVITRIFICATION OF GLASS FRITS CONTAINING 91 PARTS OF BATIO3 AND 9 PARTS OF B203 AND IMPURITIES. MECHANICAL PROPERTIES OF MICROMOULD WAFERS (96-98% AL203).
AD-287 165 DIV. 14

*DIELECTRICS
CRYSTALS

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AD-286 981 DIV. 25

*DIELECTRICS
MATERIALS

MECHANICAL, PHYSICAL, AND ELECTRICAL PROPERTIES OF VARIOUS CERAMIC DIELECTRIC MATERIALS; PARTIAL REPLACEMENT OF SILICON DIOXIDE IN SPODUMENE BY BORON TRIOXIDE, GERMANIUM OXIDE, OR TITANIUM DIOXIDE; MODIFICATION OF BORON NITRIDE AND BARIUM TITRATE GLASS.
AD-287 166 DIV. 14

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AD-287 167 DIV. 14

PROPERTIES OF CERAMIC DIELECTRIC MATERIALS FOR POSSIBLE USE IN MICROWAVE EQUIPMENT; CRYSTAL FORMATION AND METHODS OF PREPARATION OF GLASS CONTAINING THESE MATERIALS; MECHANICAL AND ELECTRICAL PROPERTIES.
AD-287 168 DIV. 14

MECHANICAL, PHYSICAL, AND ELECTRICAL PROPERTIES OF VARIOUS CERAMIC DIELECTRIC MATERIALS; PARTIAL REPLACEMENT OF SILICON DIOXIDE IN SPODUMENE BY TITANIUM DIOXIDE; MODIFICATION OF BORON NITRIDE AND BARIUM TITANATE GLASS.
AD-287 172 DIV. 14

*DIESEL ENGINES
COMBUSTION

COMBUSTION IN DIESEL ENGINES.
AD-287 259 DIV. 27

*DIFFERENTIAL CROSS SECTION

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AD-287 129 DIV. 20

PION-NUCLEON DIFFRACTION SCATTERING AT 3, 4, 5 BEV/C; ELASTIC DIFFERENTIAL CROSS SECTION OF PIONS ON PROTONS.
AD-287 130 DIV. 20

*DIFFERENTIAL EQUATIONS

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AD-287 611 DIV. 8

THE CALCULATION OF THE SIMPLEST OPTIMUM RELAY SYSTEMS OF THE SECOND ORDER.
AD-287 723 DIV. 30

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*DIFFERENTIAL EQUATIONS
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AD-287 726 DIV. 15

*DIFFUSERS

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*DIFFUSION

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AD-287 486 DIV. 14

*DIFFUSION
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AD-287 284 DIV. 2

*DIGITAL COMPUTERS

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AD-287 061 DIV. 8

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*DIGITAL COMPUTERS
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AD-287 527 DIV. 30

*DIGITAL SYSTEMS

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AD-287 624 DIV. 2

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AD-287 866 DIV. 8

*DIODES

HIGH-CURRENT TUNNEL DIODES OF GERMANIUM, SILICON, AND GALLIUM ARSENIDE. SILICON WAS INFERIOR TO GERMANIUM AND GALLIUM ARSENIDE.
AD-287 463 DIV. 8

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*DIODES
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AD-287 036 DIV. 8

*DIODES
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GALLIUM ARSENIDE VARACTOR DIODES. DEVICES WERE FABRICATED USING BOTH MELT-GROWN GAAS AND EPITAXIAL MATERIAL. THE HIGHEST CUTOFF FREQUENCIES WERE ACHIEVED USING MELT GROWN GAAS; THE BEST DEVICES FABRICATED HAD CUTOFF FREQUENCY VALUES CLOSE TO THE MAXIMUM THEORETICAL VALUE FOR THE MATERIAL USED.
AD-287 164 DIV. 8

*DIPOLE ANTENNAS
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TRANSIENT RESPONSE OF LINEAR ANTENNAS DRIVEN FROM A COAXIAL LINE. TRANSIENT RESPONSE OF STRAIGHT WIRES CONNECTED TO COAXIAL LINES IS STUDIED THEORETICALLY WHERE A PULSE IS APPLIED TO THE COAXIAL LINES.
AD-287 038 DIV. 8

*DIRECTORIES

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AD-287 028 DIV. 20

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AD-287 073 DIV. 16

*DISEASES
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AD-287 191 DIV. 16

*DISPLAY SYSTEMS

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*DISSOCIATION

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*DOPPLER NAVIGATION

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*DOPPLER TRACKING

DESIGN OF A RECEIVING STATION TO ALLOW A SIMULTANEOUS RECEPTION OF TWO FREQUENCIES OF A SATELLITE PROVIDING TRACKING DATA.
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*DOPPLER TRACKING
MATHEMATICAL ANALYSIS

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AD-287 107 DIV. 12

*DOPPLER TRACKING
SATELLITE VEHICLES

THE EFFECT OF FREQUENCY TRACKING; THE USE OF A PHASE-LOCK LOOP, AND PREDICTED TRACKING ON RECEIVER SENSITIVITY.
AD-286 926 DIV. 12

*DOSIMETERS

A FILM BADGE DOSIMETER (RBLD) WAS DEVISED TO PROVIDE RAPID METHOD FOR DETERMINING EFFECTIVE ENERGIES BELOW 200 KEV OF AN UNKNOWN ELECTROMAGNETIC RADIATION. THESE RADIATIONS WERE CO(60) GAMMA; 140 MEV PROTONS; 730 MEV PROTONS AND 900 MEV ALPHAS. A METHOD TO REDUCE FILM DENSITY VARIANCES ARISING FROM SMALL DIFFERENCES IN FILM PROCESSING IS DESCRIBED. A PRE-EXPOSED RADIATION CONTROL FILM IS DEVELOPED SIMULTANEOUSLY WITH EACH SET OF EXPERIMENTAL FILMS.
AD-287 071 DIV. 20

*DRY CELLS

EVALUATION OF RELIABILITY OF DRY CELLS (LECLANCHE WAFER CELLS) OF DIFFERENT SIZES, STORED UNDER CONDITIONS OF VARYING TEMPERATURES AND LENGTH OF STORAGE TIME.
AD-286 972 DIV. 7

LOW TEMPERATURE BA-2270/U-ALT-I BATTERIES. TWENTY-FOUR MONTHS DELAYED TESTING FOR THE LICLICP-2 LOW TEMPERATURE LECLANCHE SYSTEM. DISCHARGE TESTS WERE RUN AT 70, -20 AND -40 F AFTER 24 MONTHS STORAGE. ELECTROLYTE LEAKAGE, PREFERENTIAL ZINC CORROSION AND OTHER FACTORS AFFECTING PERFORMANCE ARE DISCUSSED.
AD-287 865 DIV. 7

*DYES

PHOTOCHEMISTRY OF DYES. OVER-ALL AIM OF THIS PROJECT IS TO INVESTIGATE DYE SYSTEMS WHICH COULD LEAD TO THE UTILIZATION OF SOLAR ENERGY. TOPICS INCLUDE: STEPWISE PHOTOREVERSIBLE DYE SYSTEMS; PHOTO-INDUCED BINDING OF FLUORESCEIN DYES; DICHROIC MOLECULES; PHOTOCHEMICAL REACTIONS.
AD-287 401 DIV. 4

*EAR

A REVIEW OF RESULTS OF A FOLLOWUP PROCEDURE WHICH OBTAINED LONG-TERM INFORMATION ON 192 EARS WHICH HAD EXPERIENCED STAPES MOBILIZATION SURGERY. RESULTS SHOW THAT APPROXIMATELY ONE YEAR AFTER SURGERY, 50% OF THE CASES MAINTAINED AT LEAST 25% IMPROVEMENT IN HEARING. OLDER PATIENTS MAINTAINED PROPORTIONATELY GREATER IMPROVEMENT IN HEARING FOR AT LEAST THREE YEARS. FINALLY, THERE WAS A STRONG TENDENCY FOR THE OPERATION TO

BE MORE SUCCESSFUL WHEN SURGERY WAS REQUIRED ON ONLY ONE EAR THAN IN INSTANCES WHEN IT WAS REQUIRED ON BOTH EARS.
AD-287 087 DIV. 16

*EAR
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*EARTH
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A TRANSLATION ON THE PRINCIPLES OF THE THEORY OF MAGNETOTELLURIC PROFILING.
AD-287 681 DIV. 2

*EARTH
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APPLICATION OF THE MAGNETOTELLURIC AND TELLURIC METHODS IN CENTRAL ALBERTA.
AD-287 603 DIV. 2

*EARTH MOVING EQUIPMENT

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*ECONOMICS
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*EGGS

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*EJECTION SEATS

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AD-287 479 DIV. 1

*ELASTIC SCATTERING

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PION-NUCLEON DIFFRACTION SCATTERING AT 3, 4, 5 BEV/C; ELASTIC DIFFERENTIAL CROSS SECTION OF PIONS ON PROTONS.
AD-287 130 DIV. 20

*ELASTIC SHELLS

EQUATIONS FOR SHALLOW SHELL THEORY APPLIED TO EQUILIBRIUM AND BUCKLING PHENOMENA; RESULTS FOUND TO BE IN AGREEMENT WITH EXPERIMENTAL DATA.
AD-287 295 DIV. 25

*ELECTRIC ARCS

ENERGY BALANCE OF A WHIRL STABILIZED HYDROGEN ARC. TOTAL ENERGY BALANCE REVEALED QUESTIONABLE STABILITY BELOW 90 AMPERES. A MARKED HYSTERESIS WAS OBSERVED BETWEEN 60 AND 90 AMPERES BY VARYING CHAMBER PRESSURE. INITIAL INCREASE OF POWER AT CONSTANT PRESSURE LED TO A POSITIVE VOLTAGE-CURRENT CHARACTERISTIC.
AD-286 927 DIV. 25

*ELECTRIC DETONATORS

DESIGN AND DEVELOPMENT OF AN ELECTRO-EXPLOSIVE DEVICE EMBODYING A SPARK GAP BRIDGED BY A HIGH IMPEDANCE SEMI-CONDUCTOR MATERIAL IN SUCH A MANNER AS TO RENDER THE DEVICE IMMUNE TO STRAY RADIOFREQUENCY ENERGY.
AD-287 608 DIV. 22

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AD-287 796 DIV. 22

*ELECTRIC DISCHARGES

ENERGY BALANCE OF A WHIRL STABILIZED HYDROGEN ARC. TOTAL ENERGY BALANCE REVEALED QUESTIONABLE STABILITY BELOW 90 AMPERES. A MARKED HYSTERESIS WAS OBSERVED BETWEEN 60 AND 90 AMPERES BY VARYING CHAMBER PRESSURE. INITIAL INCREASE OF POWER AT CONSTANT PRESSURE LED TO A POSITIVE VOLTAGE-CURRENT CHARACTERISTIC.
AD-286 927 DIV. 25

*ELECTRIC FIELDS

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AD-287 036 DIV. 8

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*ELECTRIC IGNITERS

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AD-287 608 DIV. 22

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*ELECTRIC INSULATION

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AD-287 165 DIV. 14

A TRANSLATION OF SELECTED ARTICLES ON PLASTICS AND RESINS FROM THE RUSSIAN PERIODICAL SUDOSTROYENIYE (SHIPBUILDING).
AD-287 610 DIV. 14

*ELECTRIC POWER PRODUCTION
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AD-287 519 DIV. 7

*ELECTRIC PROPULSION

MANUAL AND DIGITAL COMPUTER PROGRAM FOR OPTIMIZATION OF SPUR 350 KW AND 1000 KW NUCLEAR SPACE POWER.
AD-287 890 DIV. 12

*ELECTRIC PROPULSION
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*ELECTRIC SWITCHES
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A PRACTICAL SOLID STATE SYSTEM TO REPLACE THE CONVENTIONAL ELECTRICAL POWER SWITCHING SYSTEM USED IN PRESENT DAY AIRCRAFT.
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*ELECTRICAL CONDUCTANCE

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AD-287 447 DIV. 25

A SUMMARY AND REVISION OF EXISTING THEORY ON CONVENTIONAL THERMOCOUPLES.
AD-287 533 DIV. 25

*ELECTRICAL NETWORKS

RESULTS IN THE THEORY OF ACTIVE NETWORKS. BOUNDS ON THE FLOQUET EXPONENTS OF SYSTEMS CREATED BY EMBEDDING LINEAR PERIODIC ELEMENTS IN PASSIVE NETWORKS.
AD-287 611 DIV. 8

A METHOD FOR DETERMINING THE CHARACTERISTIC IMPEDANCES AND DEGREE OF MISMATCH OF TWO-TERMINAL PAIR NETWORKS. TRANSLATION OF A SOVIET PATENT.
AD-287 687 DIV. 7

*ELECTRICITY
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AD-287 447 DIV. 25

*ELECTRODES
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AD-287 055 DIV. 7

*ELECTRODIALYSIS

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AD-287 519 DIV. 7

*ELECTROLYTIC CAPACITORS

SOLID TANTALUM CAPACITOR. PROGRAM OBJECTIVES INCLUDE DESIGN AND DEVELOPMENT OF A SOLID ELECTROLYTE TA CAPACITOR CAPABLE OF OPERATION AT 100 VOLTS AT 85C, AND A 20 VOLT SOLID ELECTROLYTE TA CAPACITOR CAPABLE OF OPERATION AT 350 UTILIZING FOAMED TA AS THE CAPACITOR ANODE.
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*ELECTROLYTIC CELLS

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AD-287 221 DIV. 7

DEPOLARIZERS FOR HIGH ENERGY DENSITY THERMAL BATTERIES; POLARIZATION CURVES, CHRONOPOTENTIOMETRIC STUDIES, AND DIFFUSION MEASUREMENTS; SULFATES, PHOSPHATES AND OTHER OXYGENATED ANIONS OF GROUPS III A AND VI A.
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*ELECTROMAGNETIC FIELDS
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*ELECTROMAGNETIC FIELDS
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*ELECTROMAGNETIC SHIELDING
ORDNANCE

A MINIATURE LOW-PASS ATTENUATOR USED IN AN ELECTRICAL CIRCUIT TO REDUCE TO A NEGLIGIBLE LEVEL THE RF POWER TRANSMITTED IN THE ATTENUATION BAND. PROTECTION FOR A WEAPON ELECTRO-EXPLOSIVE DEVICES AGAINST SPURIOUS ENERGIES.
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*ELECTROMAGNETIC WAVE REFLECTIONS

AN APPROACH TO AZIMUTH ANGLE REFRACTION CORRECTIONS. A MODEL IS PROPOSED WHICH UTILIZES METEOROLOGICAL PROFILES TO DESCRIBE THE LOWER TROPOSPHERE.
AD-287 230 DIV. 8

*ELECTROMAGNETIC WAVES

A METHOD OF DECREASING THE ELECTRON DENSITY IN THE IONOSPHERIC D-REGION BY MEANS OF HEATING THE ELECTRONS USING INTENSE ELECTROMAGNETIC RADIATION FROM HIGH-POWERED GROUND-BASED TRANSMITTERS.
AD-287 186 DIV. 8

VERY LOW FREQUENCY PROPAGATION; ELECTRON AND SOLID STATE PHYSICS; CONTROL SYSTEMS; COMMUNICATIONS AND NETWORKS; MICROWAVE APPLICATIONS OF FERROMAGNETIC MATERIALS; AND ELECTROMAGNETIC RADIATION.
AD-287 194 DIV. 8

STUDY OF PROPAGATION OF ELECTROMAGNETIC WAVES IN A DIRECTION PERPENDICULAR TO THE EXTERNAL MAGNETIC FIELD INDICATES THAT TRANSFER OF ENERGY WILL NOT OCCUR AT A STEADY STATE CONDITION.
AD-287 690 DIV. 25

THE SPACE RADIATION GUIDE IS PRESENTED TO PROVIDE FACTUAL DATA CURRENTLY KNOWN AND TO POINT OUT AREAS WHERE INFORMATION IS SKETCHY AND INCONCLUSIVE. COSMIC RAYS, SOLAR RADIATION AND THE GEOMAGNETICALLY TRAPPED RADIATIONS. INSTRUMENTS FOR MEASURING THESE RADIATIONS, SHIELDING TECHNIQUES, AND BIOLOGICAL EFFECTS.
AD-287 863 DIV. 32

*ELECTROMAGNETIC WAVES
RADIOFREQUENCY

RADIATION FROM A LINE SOURCE IN A UNIAXIALLY ANISOTROPIC PLASMA.
AD-287 036 DIV. 8

*ELECTRON ACCELERATORS

RADIATION INDUCED POLYMERIZATION OF VINYL MONOMERS; BALANCING EFFECT BETWEEN IN-SCATTERING AND OUT-SCATTERING; NON-UNIFORMITY OF THE SCATTERING BEAM; ELECTRON ACCELERATION.
AD-287 561 DIV. 20

ELECTRON BEAMS

ELECTRON-BEAM WELDING. STRENGTHS OF THE 180,000 PSI ULTIMATE STRENGTH LEVEL WERE PRODUCED BY ELECTRON BEAM WELDMENTS IN SOLUTIONIZED AND ROLLED TI ALLOY SHEET. MODULI OF ELASTICITY IN BASE METAL AND FUSION ZONES MAY BE MATCHED FOR TI ALLOYS IN ANY CONDITION OF HEAT TREATMENT OR HARDNESS PRIOR TO WELDING.
AD-287 403 DIV. 26

ELECTRON-BEAM WELDING AND MELTING; MACHINING; AVAILABLE ELECTRON-BEAM WELDING MACHINES DESCRIBED; SELECTED BIBLIOGRAPHY ON ELECTRON-BEAM PROCESSES INCLUDED.
AD-287 433 DIV. 20

MAGNETRON INJECTION TYPE GUNS AND PIERCE-TYPE GUN DERIVATIVES ARE USED FOR THE FORMATION OF STABLE, WELL-FOCUSED, HIGH PERVEANCE, LARGE DIAMETER HOLLOW ELECTRON BEAMS.
AD-287 455 DIV. 8

DESIGN AND DEVELOPMENT OF 2 TYPES OF ELECTRON BEAM SOURCES FOR EVAPORATION OF REFRACTORY OXIDE FILMS; HEMISPHERICAL SHAPE GUN; A PIERCE GUN; THEORY MAXIMUM POWER DENSITY.
AD-287 830 DIV. 8

ELECTRON GUNS

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DESIGN AND DEVELOPMENT OF 2 TYPES OF ELECTRON BEAM SOURCES FOR EVAPORATION OF REFRACTORY OXIDE FILMS; HEMISPHERICAL SHAPE GUN; A PIERCE GUN; THEORY MAXIMUM POWER DENSITY.
AD-287 830 DIV. 8

ELECTRON TUBE OSCILLATORS

THE O TYPE CARCINOTRON AS A SUBMILLIMETER WAVE GENERATOR. CARCINOTRONS HAVING A CENTER FREQUENCY OF 350 KMC, OUTPUT POWER OF 10 MILLIWATTS CW, 10% BANDWIDTH, AND A 10,000 V MAXIMUM VOLTAGE.
AD-287 141 DIV. 8

ELECTRONIC EQUIPMENT

BUILDING BLOCK STUDY. PROGRAMMED, AUTOMATIC FIELD MAINTENANCE TESTING OF ELECTRONIC SYSTEMS.
AD-287 630 DIV. 8

A MECHANICAL ASSEMBLY TECHNIQUE OF ELECTRONIC COMPONENTS TO SUBASSEMBLIES WITHOUT THE USE OF MOLECULAR BONDS OR SOLENOID CONNECTIONS.
AD-287 748 DIV. 8

ELECTRONIC EQUIPMENT
MEASUREMENT

FEASIBILITY STUDY OF MISSILE TRAJECTORY MEASURING SYSTEM. DESCRIPTION AND OPERATION OF DOPL MISSILE TRACKING SYSTEM. DISCUSSION OF MIRAN SYSTEM VERSUS DOPL SYSTEM DESIGN.
AD-287 245 DIV. 12

ELECTRONIC EQUIPMENT
NUCLEAR WARFARE

PROBLEM AREAS ASSOCIATED WITH THE PERFORMANCE AND RELIABILITY OF SHIPBOARD ELECTRONIC EQUIPMENT OPERATING IN NUCLEAR RADIATION ENVIRONMENTS.
AD-287 640 DIV. 20

ELECTRONIC SWITCHES

HIGH CURRENT AND HIGH VOLTAGE SILICON CONTROLLED RECTIFIERS.
AD-287 296 DIV. 8

ELECTRONIC SWITCHES
TRANSISTORS

A PRACTICAL SOLID STATE SYSTEM TO REPLACE THE CONVENTIONAL ELECTRICAL POWER SWITCHING SYSTEM USED IN PRESENT DAY AIRCRAFT.
AD-287 014 DIV. 8

ELECTRONS

ELECTRONS AND HOLES WERE PRODUCED IN MIXED CRYSTALS OF KCL-KBR AND KCL-KBCL SOLID SOLUTION SYSTEMS BY IRRADIATION WITH 3-MEV ELECTRONS AT -190, -30, AND 20 C WITH DOSES OF 10 TO THE 6TH POWER RADS.
AD-286 982 DIV. 25

STUDY OF ELECTRON CONDUCTION AND THERMOPOWERS OF METALS IN STRONG MAGNETIC FIELDS INDICATES THE DEPENDENCE OF THERMOPOWER UPON MAGNETIC FIELDS WILL, UNDER CERTAIN CONDITIONS, BE SIGNIFICANTLY CHANGED BY THE PRESENCE OF PHONON DRAG.
AD-287 484 DIV. 9

THE PERFORMANCE OF A GEIGER-MUELLER COUNTER IN THE 200 A REGION.
AD-287 592 DIV. 30

A TRANSLATION ON THE BREMSSTRAHLUNG SPECTRUM OF 260-KEV ELECTRONS.
AD-287 676 DIV. 20

A SUMMARY AND REVISION OF EXISTING THEORY ON CONVENTIONAL THERMOCOUPLES.
AD-287 833 DIV. 25

ELLIPSOIDS

BIVARIATE ACCEPTANCE SAMPLING PROCEDURES ARE DEVELOPED FOR GENERAL SPECIFICATION ELLIPSES OF A STATISTICAL DISTRIBUTION.
AD-287 560 DIV. 15

EMBEDDING SUBSTANCES

ELECTRICAL PROPERTIES OF SILICONE RUBBER POTTING COMPOUNDS - DIELECTRIC CONSTANT AND DISSIPATION FACTOR AT 77 F; DIELECTRIC CONSTANT AND LOSS TANGENT AT 77 AND 500 F.
AD-287 823 DIV. 14

ENGINEERING

POLYINVARIANCE IN AUTOMATIC CONTROL SYSTEMS. INVARIANCE OF STABILIZATION AND REPRODUCTION SYSTEMS RELATIVE TO SEVERAL DISTURBANCES. ANALYSIS OF TRANSIENT AND STEADY-STATE PROCESSES IN PULSE-RELAY AND MINIMAX SYSTEMS.
AD-287 732 DIV. 30

MINOR CONSTRUCTIONAL MODIFICATIONS IN THE PRESENT DESIGN OF POWER TUBES ARE INVESTIGATED AND FACILITIES FOR MORE RAPID RATE OF PRODUCTION WERE SET UP.
AD-287 836 DIV. 8

ENGINEERING PERSONNEL

THE RATIO OF MANPOWER SUPPORT TO PROFESSIONAL PERSONNEL IN RESEARCH AND DEVELOPMENT LABORATORIES. HELP VS HINDRANCE IS CONSIDERED AS A FACTOR IN JOB RETENTION.
AD-287 809 DIV. 28

EPOXY RESINS

THE THERMAL CONDUCTIVITY WAS MEASURED FOR PANELS OF SILICONE RUBBER FOAM, FIBERGLAS COMPOSITES, AND AN EPOXY RESIN MICROBALLOON COMPOSITE WITH ONE FACE AT 120 F AND THE OTHER FACE AT 250, 350 AND 450 F.
AD-287 150 DIV. 14

MECHANICAL BEHAVIOR AND FRACTURE MORPHOLOGY OF EPOXY RESIN INGOTS.
AD-287 190 DIV. 14

A TRANSLATION OF SELECTED ARTICLES ON PLASTICS AND RESINS FROM THE RUSSIAN PERIODICAL SUDOSTROYENIYE (SHIPBUILDING).
AD-287 610 DIV. 14

DETERMINATION OF RESISTANCE OF NARMCO 9135 RESIN ADHESIVE TO SKYDROL 500 FLUID; EFFECT OF CURING TEMPERATURE ON TENSILE SHEAR STRENGTH OF THE RESIN.
AD-287 621 DIV. 14

EQUILIBRATORS

EQUATIONS FOR SHALLOW SHELL THEORY APPLIED TO EQUILIBRIUM AND BUCKLING PHENOMENA; RESULTS FOUND TO BE IN AGREEMENT WITH EXPERIMENTAL DATA.
AD-287 295 DIV. 25

ERRORS

THE THEORY OF WEIGHT DISTRIBUTION AND RELATED PROBLEMS FOR CYCLIC ERROR-CORRECTING CODES ARE PRESENTED.
AD-286 990 DIV. 30

AN APPROACH TO AZIMUTH ANGLE REFRACTION CORRECTIONS. A MODEL IS PROPOSED WHICH UTILIZES METEOROLOGICAL PROFILES TO DESCRIBE THE LOWER TROPOSPHERE.
AD-287 230 DIV. 8

STANDARD ERRORS OF COSMIC RAY DATA CORRECTED FOR ATMOSPHERIC EFFECTS.
AD-287 947 DIV. 2

ETHERS

IR SPECTRA OF SELECTED KETONES, ETHERS AND ALCOHOLS BETWEEN 15 AND 35 MICRONS. SPECTRA OF KETONES IN THIS MICRON REGION ARE VERY INFORMATIVE OF THEIR DETAILED STRUCTURAL FEATURES AND DISTINGUISH BETWEEN ALIPHATIC METHYL KETONES, KETONES WITH AND WITHOUT ALPHA BRANCHING, AROMATIC METHYL KETONES AND CYCLIC KETONES.
AD-287 755 DIV. 4

ETHYLENES
POLYMERS

A TRANSLATION OF SELECTED ARTICLES ON PLASTICS AND RESINS FROM THE RUSSIAN PERIODICAL SUDOSTROYENIYE (SHIPBUILDING).
AD-287 610 DIV. 14

EVAPORATION

DESIGN AND DEVELOPMENT OF 2 TYPES OF ELECTRON BEAM SOURCES FOR EVAPORATION OF REFRACTORY OXIDE FILMS; HEMISPHERICAL SHAPE GUN; A PIERCE GUN; THEORY MAXIMUM POWER DENSITY.
AD-287 830 DIV. 8

EXPANDED PLASTICS

THE THERMAL CONDUCTIVITY WAS MEASURED FOR PANELS OF SILICONE RUBBER FOAM, FIBERGLAS COMPOSITES, AND AN EPOXY RESIN MICROBALLOON COMPOSITE WITH ONE FACE AT 120 F AND THE OTHER FACE AT 250, 350 AND 450 F.
AD-287 150 DIV. 14

EXPANDED PLASTICS
TOXICITY

SUMMARY OF GENERAL AND SPECIFIC TOXICITY IN MICE, RATS, AND DOGS OF PREPOLYMERS, CATALYSTS, AND POLYMERIZED POLYURETHANE MEASURED BY SEVERAL METHODS REVEAL THE RELATIVE LACK OF TOXICITY OF THESE COMPOUNDS WITHIN THE EXPERIMENTAL FRAMEWORK DESCRIBED. STUDIES OF C14 RING LABELLED POLYURETHANE IMPLANTED INTO RAT TIBIAS INDICATED BEGINNING MOBILIZATION FROM THE SITE OF IMPLANT AT APPROXIMATELY 30 WEEKS POST IMPLANT.
AD-287 206 DIV. 16

EXPLOSIVE DECOMPRESSION

EXPLOSIVE HOLE PIERCING BY SHAPED CHARGES AND MISS EXPLOSIVE CHARGE IN WATER TANKS.
AD-287 418 DIV. 17

EXPLOSIVE FORMING

PERMANENT CHANGES PRODUCED IN THE MECHANICAL PROPERTIES OF ANNEALED STEELS (1015, 1030, 1050, AND 4130) BY MEANS OF CONTACT EXPLOSIVE CHARGES OF DIFFERENT THICKNESSES.
AD-287 201 DIV. 26

EXPLOSIVES
SENSITIVITY

SENSITIVITY OF CASED EXPLOSIVE MATERIALS TO IMPACT BY REGULAR FRAGMENTS.
AD-287 641 DIV. 22

SENSITIVITY OF CASED EXPLOSIVE MATERIALS TO IMPACT BY REGULAR FRAGMENTS.
AD-287 642 DIV. 22

EXPLOSIVES
SHOCK

CALCULATED PEAK PRESSURE-DISTANCE CURVES FOR PENTOLITE AND TNT. KIRKWOOD-BRINKLEY THEORY AND EQUATIONS.
AD-287 258 DIV. 22

EXTRATERRESTRIAL RADIO WAVES

STUDIES OF IONOSPHERIC ABSORPTION OF RADIO WAVES BY THE COSMIC NOISE METHOD.
AD-287 858 DIV. 2

EXTRUSION

MOLYBDENUM ALLOY EXTRUSION DEVELOPMENT PROGRAM. FULL LENGTH T SHAPE EXTRUSIONS OF TZM WERE MADE WITHIN TARGET REQUIREMENTS FROM 3200-3400F BILLET HEATING WITH A REDUCTION RATIO OF ABOUT 13:1. HIGH LINER PRESSURE IN EXCESS OF 200 KSI AT AN INITIAL STEM SPEED OF 100 IN/MIN WAS REQUIRED.
AD-286 932 DIV. 17

EFFECT OF BILLET HISTORY ON THE HOT EXTRUDED PROPERTIES OF 1020, 4330 AND SI-MODIFIED 4340 STEELS; TENSILE TESTS, METALLOGRAPHIC EXAMINATION, ELONGATION, DEFORMATION, AND HEAT TREATMENT.
AD-287 004 DIV. 26

EXTRUSION
NIOBIUM ALLOYS

NB ALLOY EXTRUSION PROGRAM. PHASE V. TWO 8 IN. DIAMETER INGOTS OF (B-10W-1ZR-.1C (X-110) AND NB-5W-5V-1ZR (D-60) ALLOYS WERE MELTED AND CONVERTED TO 8 IN. DIAMETER BILLET STOCK BY EXTRUSION. TUBE BLANK EXTRUSIONS OF 911 RATIO WERE MADE AT 3200-3400 F. PROCESS PARAMETER EFFECTS ARE REPORTED.
AD-287 436 DIV. 17

EYE
FLASH BURNS

A SUMMARY OF PROJECT ACTIVITIES ON FLASHBLINDNESS, SPECTRAL RESPONSE CHARACTERISTICS OF THE

VISUAL SYSTEM, AND ANIMAL STUDIES OF VISUAL PROCESSES.
AD-286 906 DIV. 16

*FAILURE (MECHANICS)
AXIAL-FLOW COMPRESSOR BLADES

FATIGUE TESTS AND CRACK DETECTION ON SOME TYPES OF AXIAL FLOW COMPRESSOR ROTOR BLADES. DATA PROVIDED A GENERAL COMPARISON OF ***AS MANUFACTURED** ENDURANCE LIMITS AND WERE USED AS A VERIFICATION CONTROL IN EVALUATING A SUPPLEMENTARY METHOD OF DETECTING FAILED BLADES.
AD-287 410 DIV. 27

*FATIGUE (MECHANICS)

PROGRAMMED MANEUVER-SPECTRUM FATIGUE TESTS OF AIRCRAFT BEAM SPECIMENS. BENDING FATIGUE PROPERTIES OF A GROUP OF 7075-T6 AL ALLOY BEAM SPECIMENS WERE FOUND TO BE SIMILAR TO THOSE OF TYPICAL AIRCRAFT STRUCTURES. PRESTRESSING, PERIODIC SINGLE OVERSTRESSING AND PERIODIC REPEATED UNDERSTRESSING EFFECTS ARE DISCUSSED.
AD-287 546 DIV. 17

FATIGUE CRACK DETECTION, EFFECT OF SURFACE REMOVAL, AND FATIGUE PROPERTIES OF VACUUM AND CONVENTIONAL MELTING SAE 4340 STEEL, AND DYNAMIC PROPERTIES OF NITRIDED NITRALLOY 135 MODIFIED STEEL.
AD-287 819 DIV. 17

*FATIGUE (PHYSIOLOGY)

STUDIES OF TEMPORARY THRESHOLD SHIFT CAUSED BY HIGH INTENSITY ACOUSTIC TRANSIENTS.
AD-287 810 DIV. 16

*FATS

THE ADDITIVE EFFECT OF A CARBONIC ANHYDRASE INHIBITOR, ACETAZOLAMIDE, AND THE INTRAVENOUS INFUSION OF FAT EMULSION ON THE DIFFERENCE BETWEEN THE ALVEOLAR AND ARTERIAL CARBON DIOXIDE TENSION STRONGLY SUGGESTS THAT FAT EMULSION DOES NOT EXERT ITS EFFECT BY INTERFERENCE WITH THE INTERCONVERSION OF CO2 AND BICARBONATE.
AD-287 075 DIV. 16

*FATS
CHROMATOGRAPHIC ANALYSIS

INTRAVENOUS FAT EMULSIONS ARE EXAMINED BY GAS, THIN LAYER, AND COLUMN CHROMATOGRAPHY TO IDENTIFY AND CHARACTERIZE IMPURITIES IN THE OILS AND EMULSIFYING AGENTS TO PROVIDE A BASIS FOR SPECIFICATIONS THAT WILL REDUCE THE VARIABILITY IN DIFFERENT BATCHES AND REDUCE REACTIONS THAT ARISE FROM IMPURITIES.
AD-287 402 DIV. 16

*FEEDBACK

THE CALCULATION OF THE SIMPLEST OPTIMUM RELAY SYSTEMS OF THE SECOND ORDER.
AD-287 723 DIV. 30

STABLE, PHYSICALLY REALIZABLE, LINEAR, TIME-INVARIANT SYSTEMS.
AD-287 786 DIV. 30

*FERRITES

PREPARATION OF A SERIES OF FINE-GRAINED FERRITES WITH THE FORMULA NI1-XZNXFE2O4 WHERE X IS 0.10 TO 0.67; MICROWAVE PROPERTIES AND TEMPERATURE DEPENDENCE OF PERMEABILITY.
AD-287 613 DIV. 25

*FERRITES
MANUFACTURING METHODS

DEVELOPMENT OF BROAD-BAND ELECTROMAGNETIC ABSORBERS FOR ELECTRO-EXPLOSIVE DEVICES. CARBONYL IRON, FERRITES, FABRICATION TECHNIQUES, DIELECTRIC INSULATORS, HIGH K CERAMICS, ATTENUATION MEASURING SYSTEM.
AD-287 196 DIV. 8

*FERROELECTRIC CRYSTALS

INSULATION RESEARCH; TOPICS INCLUDE HIGH-DIELECTRIC-CONSTANT MATERIALS; HIGH-TEMPERATURE DIELECTRICS; BREAKDOWN; FIELD EMISSION; DIELECTRIC AND ELASTIC SPECTROSCOPY; CRYSTAL PHYSICS; MAGNETICS; MATHEMATICAL CRYSTALLOGRAPHY; MAGNETIC SPECTROSCOPY; OPTICAL MODULATION.
AD-286 981 DIV. 25

*FERROELECTRIC MATERIALS

MANUFACTURING METHODS FOR LARGE SCALE PRODUCTION OF HIGH PURITY FERROELECTRIC OR PIEZOELECTRIC CERAMIC MATERIALS FOR ELECTRONIC APPLICATIONS. BARIUM TITANATES, ZIRCONATES, NIOBATES, AND TANTALATES.
AD-287 012 DIV. 14

CERAMIC DIELECTRICS. UTILIZATION OF THE DEVITRIFICATION PROCESS FOR FERROELECTRIC CERAMICS. ELECTRICAL PROPERTIES OF BODIES PRODUCED BY DEVITRIFICATION OF GLASS FRITS CONTAINING 91 PARTS OF BATIO3 AND 9 PARTS OF B2O3 AND IMPURITIES. MECHANICAL PROPERTIES OF MICROMODULE WAFERS (94-96% AL2O3).
AD-287 165 DIV. 14

MECHANICAL, PHYSICAL, AND ELECTRICAL PROPERTIES OF VARIOUS CERAMIC DIELECTRIC MATERIALS; PARTIAL REPLACEMENT OF SILICON DIOXIDE IN SPODUMENE BY BORON TRIOXIDE, GERMANIUM OXIDE, OR TITANIUM DIOXIDE; MODIFICATION OF BORON NITRIDE AND BARIUM TITRATE GLASS.
AD-287 166 DIV. 14

PROPERTIES OF CERAMIC DIELECTRIC MATERIALS FOR POSSIBLE USE IN MICROWAVE EQUIPMENT. DEVITRIFICATION; CRYSTAL FORMATION; AND METHODS OF PREPARATION OF GLASS CONTAINING THESE MATERIALS; MECHANICAL AND ELECTRICAL PROPERTIES.
AD-287 167 DIV. 14

PROPERTIES OF CERAMIC DIELECTRIC MATERIALS FOR POSSIBLE USE IN MICROWAVE EQUIPMENT; CRYSTAL FORMATION AND METHODS OF PREPARATION OF GLASS CONTAINING THESE MATERIALS; MECHANICAL AND ELECTRICAL PROPERTIES.
AD-287 168 DIV. 14

MECHANICAL, PHYSICAL, AND ELECTRICAL PROPERTIES OF VARIOUS CERAMIC DIELECTRIC MATERIALS; PARTIAL REPLACEMENT OF SILICON DIOXIDE IN SPODUMENE BY TITANIUM DIOXIDE; MODIFICATION OF BORON NITRIDE AND BARIUM TITANATE GLASS.
AD-287 172 DIV. 14

*FERROMAGNETIC MATERIALS

PREPARATION OF A SERIES OF FINE-GRAINED FERRITES WITH THE FORMULA NI1-XZNXFE2O4 WHERE X IS 0.10 TO 0.67; MICROWAVE PROPERTIES AND TEMPERATURE DEPENDENCE OF PERMEABILITY.
AD-287 613 DIV. 25

*FIBERBOARD

BOARDS MADE FROM REPULPED NEWSPAPER AND WOOD PULP WERE TESTED FOR DENSITY AND CO2 DIFFUSIVITY; APPLICATION OF THE WET-PRESSING METHOD.
AD-287 446 DIV. 14

*FILMS
PHYSICAL PROPERTIES

DESIGN AND DEVELOPMENT OF 2 TYPES OF ELECTRON BEAM SOURCES FOR EVAPORATION OF REFRACTORY OXIDE FILMS; HEMISPHERICAL SHAPE GUN; A PIERCE GUN; THEORY; MAXIMUM POWER DENSITY.
AD-287 830 DIV. 8

*FLAME PROPAGATION

TURBULENT FLAME STUDIES IN TWO DIMENSIONAL OPEN BURNERS. EXPERIMENTAL EVIDENCE CONFIRMED THE CONCEPT THAT THE EFFECT OF TURBULENCE ON FLAMES IS ONLY TO WRINKLE AND EXTEND THE SURFACE OF THE FLAME FRONT. EXPERIMENTAL TECHNIQUES ARE DISCUSSED.
AD-287 703 DIV. 9

*FLAMES

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AD-287 703 DIV. 9

*FLASH BURNS
OPTICAL EQUIPMENT

DEVELOPMENT OF RAPID CLOSURE ELECTRO-OPTICAL CRYSTAL SHUTTER FOR PROTECTION OF PERSONNEL FROM FLASH BLINDNESS.
AD-287 896 DIV. 25

*FLIGHT

TEST PILOTS WERE COMPARED WITH NONFLYERS IN THEIR ABILITY TO ESTIMATE A FUNCTION OF THE POSTURAL VERTICAL. AN ATTEMPT IS MADE TO MINIMIZE KINESTHETIC CUES AND AN ANALYSIS OF THE AVERAGE ERROR AND SLOPE FOR EACH DAY OF 3 DAILY SESSIONS WAS CONDUCTED.
AD-287 086 DIV. 16

*FLIGHT PATHS

ESCAPE TRAJECTORIES FOR LOW THRUST VEHICLES.
AD-286 923 DIV. 12

*FLUID FLOW

ON THE STABILITY OF VISCOUS FLOW BETWEEN ROTATING CYLINDERS; NUMERICAL ANALYSIS.
AD-287 625 DIV. 9

EXPERIMENTAL INVESTIGATION OF HEAT EXCHANGE OF A PLATE WITH LONGITUDINAL AIR FLOW DIRECTED AROUND IT DIFFERS BY 8% FROM DATA CALCULATED BY FORMULAS.
AD-287 670 DIV. 25

ISOTHERMAL ACCELERATION OF A ONE-DIMENSIONAL PLASMA FLOW IN EXTERNAL TRANSVERSE HOMOGENEOUS MAGNETIC AND ELECTRICAL FIELDS.
AD-287 694 DIV. 25

A METHOD FOR PROTECTING A HOT WALL BY CREATING A LIQUID FILM ON ITS SURFACE. A FORMULA FOR DETERMINING THE VELOCITY OF THE RELATIONSHIP OF THE FLOW TO THE FREE-STREAM FLOW.
AD-287 701 DIV. 9

*FLUORESCENT DYES

PHOTOCHEMISTRY OF DYES. OVER-ALL AIM OF THIS PROJECT IS TO INVESTIGATE DYE SYSTEMS WHICH COULD LEAD TO THE UTILIZATION OF SOLAR ENERGY. TOPICS INCLUDE: STEPWISE PHOTOREVERSIBLE DYE SYSTEMS; PHOTO-INDUCED BINDING OF FLUORESCEIN DYES; DICHROIC MOLECULES; PHOTOCHEMICAL REACTIONS.
AD-287 401 DIV. 6

*FLUORIDES
TIN COMPOUNDS

THE IN VITRO EFFECTIVENESS OF STANNOUS FLUORIDE PROPHYLACTIC DENTAL PASTES WAS DETERMINED BY MEASURING THE AMOUNT OF PHOSPHORUS REMOVED BY LACTIC ACID FROM TREATED AND UNTREATED TOOTH ENAMEL SURFACES.
AD-287 091 DIV. 16

*FLUOROCARBONS

HETEROLYTIC CONVERSION OF HEXAFLUOROHYDRAZOMETHANE CHEMICAL REACTIONS WITH OXIDIZING AND REDUCING AGENTS, AND NUCLEOPHILIC REAGENTS.
AD-287 716 DIV. 4

*FOG

MEASUREMENT OF THE TRANSPARENCY OF CLOUDS AND FOG BY MEANS OF AN AIRBORNE PHOTOELECTRIC PHOTOMETER.
AD-287 216 DIV. 3

*FOILS

STATE-OF-THE-ART SURVEY. CAPABILITY OF INDUSTRY TO PRODUCE REFRACTORY METAL FOIL. SPECIFIC ALLOYS OF NB; TA AND W WERE RECOMMENDED AS CANDIDATES FOR ROLLING TO FOIL.
AD-287 408 DIV. 17

*FOOD
PRESERVATION

FOUR STRAINS OF MICE ARE BEING FED A MIXTURE OF IRRADIATED FOODS FOR THE DURATION OF THEIR LIVES TO DETERMINE WHETHER FOODS STERILIZED BY IRRADIATION ARE LIKELY TO BE CARCINOGENIC. TO DATE, HISTOPATHOLOGICAL EXAMINATIONS HAVE REVEALED NO INDICATIONS OF A SIGNIFICANT INCREASE IN TUMOR INCIDENCE.
AD-287 031 DIV. 16

*FOOD
RADIATION EFFECTS

COMPONENTS OF IONIZED IRRADIATED MEATS INJURIOUS TO REPRODUCTIVE PERFORMANCE OF FEMALE AND MALE ANIMALS.
AD-287 007 DIV. 16

RADIATION AND STERILIZATION OF FOODS.
AD-287 016 DIV. 16

*FRACTURE (MECHANICS)
COPPER ALLOYS

LIQUID METAL EMBRITTLEMENT OF A CU-2% BE ALLOY. PROPENSITY TOWARD BRITTLE FRACTURE IN THE PRESENCE OF A 2% NA AMALGAM WAS INVESTIGATED. RESULTS CORRELATED FRACTURE STRENGTH IN THE LIQUID METAL ENVIRONMENT WITH THERMAL-MECHANICAL HISTORY.
AD-287 255 DIV. 17

*FRACTURE (MECHANICS)
STRESSES

MECHANICAL BEHAVIOR AND FRACTURE MORPHOLOGY OF EPOXY RESIN INGOTS.
AD-287 130 DIV. 14

*FREQUENCY DIVIDERS

FABRICATION OF MICROELECTRONIC ASSEMBLIES FOR FREQUENCY AND TIME CONTROLS SYSTEMS.
AD-287 866 DIV. 8

*FREQUENCY MODULATION

BUILDING BLOCK STUDY. PROGRAMMED, AUTOMATIC FIELD MAINTENANCE TESTING OF ELECTRONIC SYSTEMS.
AD-287 630 DIV. 8

*FRICTION

FRICTION AND WEAR AT ELEVATED TEMPERATURES. A NUMBER OF SUBSTANCES WERE EXAMINED FOR SUITABILITY UNDER SLIDING CONDITIONS IN THE RANGE FROM ROOM TEMPERATURE TO 2000F. INFORMATION FROM FRICTION-TEMPERATURE RUNS IS DISCUSSED.
AD-287 458 DIV. 17

*FUEL CELLS

FEASIBILITY STUDIES OF PD FILMS AS H DIFFUSION ELECTRODES IN FUEL CELLS; HYDROGEN TRANSPORT PROPERTIES; THERMODYNAMIC PROPERTIES.
AD-287 055 DIV. 7

*FUELS

EFFECT OF COMPOSITION ON THE IGNITION LIMIT OF MIXTURES OF ORGANIC LIQUID FUELS; ACETONE, BENZENE, ETHANOL, AND TOLUENE.
AD-287 680 DIV. 10

*FUNCTIONS

ON FUNCTIONS ANALYTIC IN THE UPPER HALF-PLANE.
AD-286 958 DIV. 15

AN ANALYSIS IS PRESENTED WHICH DESCRIBES AN ALGORITHM FOR APPLYING LINEAR PROGRAMMING TO THE PROBLEM OF DETERMINING WHETHER OR NOT A GIVEN FUNCTION IS LINEARLY SEPARABLE, AND IF SO, WHAT ARE THE WEIGHTS AND THRESHOLD VALUES REQUIRED TO FORM THE SEPARATING SYSTEM.
AD-286 978 DIV. 8

THE THEORY OF WEIGHT DISTRIBUTION AND RELATED PROBLEMS FOR CYCLIC ERROR-CORRECTING CODES ARE PRESENTED.
AD-286 990 DIV. 30

SUCCESSIVE APPROXIMATIONS TO LYAPUNOV FUNCTIONS IN CONTROL OPTIMIZATION PROBLEMS.
AD-287 635 DIV. 15

ALGEBRAIC DEPENDENCE THEOREMS ON COMPLEX PSEUDOCONCAVE SPACES.
AD-287 775 DIV. 15

*FUSELAGES

CORROSION PROTECTIVE SYSTEM FOR THE PRESSURIZED CABIN SECTION OF THE MODEL 22 FUSELAGE; HYDROSTATIC TESTING; CATHODIC PROTECTION; STEEL TEST TANKS.
AD-287 617 DIV. 17

***GAMES THEORY**

ADAPTIVE DECISION PROCESSES ARE DESCRIBED MATHEMATICALLY.
AD-287 460 DIV. 19

INVESTIGATION OF THE HYPOTHESIS THAT A COMPETITIVE STRATEGY IN A DILEMMA GAME WHICH IS FOLLOWED BY A COLLABORATIVE STRATEGY WILL INDUCE MORE COLLABORATION FROM THE OTHER PLAYER THAN A STRATEGY WHICH EMPLOYS COLLABORATION FROM THE OUTSET.
AD-287 838 DIV. 28

***GAMMA RAYS**

GIANT RESONANCE DIPOLE TRANSITIONS IN NUCLEI.
AD-287 129 DIV. 20

RADIATION DECAY IN SOLIDS AND REACTOR MATERIALS; USSR SOURCE.
AD-287 692 DIV. 20

***GAS BEARINGS**

DEVELOPMENT OF GAS LUBRICATED BEARINGS FOR USE IN BLOWER MOTORS. WORK ON THE FORMULATION OF A GAS BEARING DESIGN MANUAL TO BE USED FOR THE DESIGN OF GAS-LUBRICATED, SELF-ACTING JOURNAL AND THRUST BEARINGS FOR BLOWER MOTORS IS REPORTED.
AD-286 911 DIV. 26

***GAS DISCHARGES**

ENERGY BALANCE OF A WHIRL STABILIZED HYDROGEN ARC. TOTAL ENERGY BALANCE REVEALED QUESTIONABLE STABILITY BELOW 80 AMPERES. A MARKED HYSTERESIS WAS OBSERVED BETWEEN 60 AND 90 AMPERES BY VARYING CHAMBER PRESSURE. INITIAL INCREASE OF POWER AT CONSTANT PRESSURE LED TO A POSITIVE VOLTAGE-CURRENT CHARACTERISTIC.
AD-286 927 DIV. 25

***GAS FLOW**

FLOW FLOW OF A DISSOCIATED GAS ABOUT A CATALYTIC PROBE; A TECHNIQUE FOR MEASURING CATALYTIC EFFICIENCIES OF SURFACES AND DIFFUSION COEFFICIENTS OF A DISSOCIATED GAS.
AD-287 095 DIV. 25

***GAS IONIZATION**

SPECTROGRAPHIC INVESTIGATION OF TEMPERATURES IN A PLASMA JET AND TUNNEL.
AD-287 128 DIV. 25

***GAS MASKS**
DESIGN

DESIGN OF A4 OPTICAL INSERT, TYPE 2, FOR THE ESSEX TANKER'S CBR PROTECTIVE MASK. THE OPTICAL INSERT WILL BE AVAILABLE IN TWO BRIDGE WIDTHS; 22 MM. (NARROW) AND 26 MM. (WIDE). MINOR MODIFICATIONS TO THE MASK ARE NECESSARY TO PROVIDE A SUPPORTING BLOCK FOR THE INSERT. PHOTOGRAPH OF PROTECTIVE MASK ATTACHED.
AD-287 134 DIV. 3

***GASES**
CONVECTION

A LINEARIZED MODEL OF UNSTEADY MOTION GENERATED BY INITIAL STATE NON-UNIFORMITIES OF CONCENTRATION, TEMPERATURE AND VELOCITY WITH SIMPLE RATE REACTION IS DEVELOPED.
AD-287 468 DIV. 9

***GASES**
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THE SUPERSONIC FLOW OF AN IDEAL GAS PAST A FLAT PLATE IN THE PRESENCE OF VOLUME HEAT TRANSFER IS PRESENTED.
AD-287 708 DIV. 9

***GASES**
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TECHNIQUE FOR THE STUDY OF MULTIPLE-TIME RELAXATION PROCESSES APPLIED TO THE CASE OF A SHORT RANGE (NEUTRAL) DILUTE GAS; KINETIC EQUATION.
AD-287 145 DIV. 25

***GERMANIUM**

ELECTRON REDUCTION RATE AND HOLE PRODUCTION RATE WERE TWO-FOLD GREATER IN DEUTERON AND PROTON IRRADIATED DENDRITIC GE CRYSTALS THAN IN ORDINARY GE CRYSTALS. THE DEMONSTRATION OF MAKING ELECTRONIC DEVICES BY A RADIATION PROCESS IS GIVEN.
AD-287 146 DIV. 25

***GERMANY**

REST BERLIN AS A BRIDGEHEAD OF SABOTAGE AGAINST PEACE; A TRANSLATION FROM PRAVDA.
AD-287 727 DIV. 19

***GLASS**

EVALUATION OF IR TRANSMITTING GLASSES SELECTED FROM THE AS-SE-TE FIELD. SUBSTITUTION AND INCORPORATION OF AG, BI, TE, CD, GE, CU, AND SB IN AS-SE GLASSES.
AD-286 980 DIV. 25

THE INFLUENCE OF WATER VAPOR AND ANNEALING ON THE STRENGTH OF SODA-LIME GLASS RODS; CORROSION EFFECTS; FLAW THEORY.
AD-287 445 DIV. 14

***GLASS TEXTILES**

ANALYSIS OF FOAMGLAS INSULATION. REFRASIL B-100 BATT WAS RECOMMENDED FOR USE AS THERMAL INSULATION IN BORAL BOXES WHICH WILL BE USED IN HIGH TEMPERATURE RADIATION EFFECT STUDIES.
AD-286 986 DIV. 14

THE THERMAL CONDUCTIVITY WAS MEASURED FOR PANELS OF SILICONE RUBBER FOAM, FIBERGLAS COMPOSITES, AND AN EPOXY RESIN MICROBALLOON COMPOSITE WITH ONE FACE AT 120 F AND THE OTHER FACE AT 250, 350 AND 450 F.
AD-287 150 DIV. 14

GLASS FIBER STRENGTH ENHANCEMENT THROUGH BUNDLE DRAWING. EXPERIMENTAL EVIDENCE OF THE STRENGTH/SIZE RELATIONSHIP IN GLASS FIBERS AND ANALYSIS PREDICTING THE INTERRELATIONSHIPS BETWEEN VARIABLES FOR GLASS FIBERS DRAWN FROM RODS. FEASIBILITY OF DRAWING VERY FINE GLASS FILAMENTS WITHIN BUNDLE DRAWN FIBERS.
AD-287 404 DIV. 14

A TRANSLATION OF SELECTED ARTICLES ON PLASTICS AND RESINS FROM THE RUSSIAN PERIODICAL SUDOSTROYENIYE (SHIPBUILDING).
AD-287 610 DIV. 14

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ATTITUDES

THE RATIO OF MANPOWER SUPPORT TO PROFESSIONAL PERSONNEL IN RESEARCH AND DEVELOPMENT LABORATORIES. HELP VS HINDRANCE IS CONSIDERED AS A FACTOR IN JOB RETENTION.
AD-287 809 DIV. 26

***GRAPHITE**

FRICTION AND WEAR AT ELEVATED TEMPERATURES. A NUMBER OF SUBSTANCES WERE EXAMINED FOR SUITABILITY UNDER SLIDING CONDITIONS IN THE RANGE FROM ROOM TEMPERATURE TO 2000F. INFORMATION FOR FRICTION-TEMPERATURE RUNS IS DISCUSSED.
AD-287 858 DIV. 17

***GRAVITY**

THE CONSTRUCTION OF A LORENTZ COVARIANT THEORY OF GRAVITATION IS TREATED.
AD-287 183 DIV. 25

CONVEYOR SYSTEM OF 40 REDESIGNED CONVEYOR SECTIONS; AL ALLOYS; AN-415 LOCK PINS.
AD-287 782 DIV. 33

***GRAVITY**
MAN

AN ANALYSIS OF TESTS PERFORMED TO DETERMINE THE CENTER OF GRAVITY IN MAN, WITH DETAILS OF EQUIPMENT AND PROCEDURE USED.
AD-287 156 DIV. 16

***GREASES**

IR SPECTRA OF SOME OILS, GREASES, ADDITIVES, AND RELATED MATERIALS. SPECTRA FROM 2 TO 16 MICRONS OF 82 OILS, GREASES, ADDITIVES AND RELATED MATERIALS ARE PRESENTED AS AN AID IN THE QUALITATIVE IDENTIFICATION OF LUBRICANTS.
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***GROUND CONTROLLED APPROACH RADAR**

ACTIVITY REPORT ON AIRPORT FACILITY INCLUDING TRAFFIC CONTROL, DISPLAY SYSTEMS, LIGHTING, COMMUNICATION, LANDING SYSTEMS.
AD-287 658 DIV. 1

***GROUND SUPPORT EQUIPMENT**

A MULTIPURPOSE RECEIVER DESIGNED TO MEET REQUIREMENTS OF SATELLITE TRACKING STATIONS FOR SPACE PROGRAMS THROUGH 1970. FREQUENCY RANGE OF 100 MC TO 10 KMC.
AD-286 985 DIV. 9

***GROUP DYNAMICS**

INVESTIGATION OF THE HYPOTHESIS THAT A COMPETITIVE STRATEGY IN A DILEMMA GAME WHICH IS FOLLOWED BY A COLLABORATIVE STRATEGY WILL INDUCE MORE COLLABORATION FROM THE OTHER PLAYER THAN A STRATEGY WHICH EMPLOYS COLLABORATION FROM THE OUTSET.
AD-287 838 DIV. 28

***GUIDANCE**
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BIBLIOGRAPHY OF SOVIET OPEN-SOURCE MATERIALS ON RADIO GUIDANCE. MATERIAL PUBLISHED FROM 1958 THROUGH MID-1962.
AD-287 217 DIV. 19

***GUIDED MISSILE COUNTERMEASURES**

USSR COMMENTS ON UNITED STATES RADIATION WEAPONS OR SO-CALLED DEATH RAYS FOR GUIDED MISSILES COUNTERMEASURES; ALSO EFFECTIVENESS OF NIKE ZEUS SYSTEM.
AD-287 725 DIV. 18

***GUIDED MISSILE LAUNCHERS**
SURFACE TO SURFACE

DETAILED RESULTS OF THE HUMAN FACTORS ENGINEERING REVIEW AND EVALUATION OF THE TITAN WEAPON SYSTEM 107A-2 LAUNCHER OPERATIONAL BASE.
AD-287 705 DIV. 12

***GUIDED MISSILE PERSONNEL**

PERSONNEL SUBSYSTEM ANALYSIS OF THE ATLAS MA-3 PROPULSION SYSTEM. IDENTIFICATION OF 59 HUMAN FACTORS PROBLEMS RELATED TO SAFETY, TRAINING, ORGANIZATIONAL CONTROLS, TECHNICAL DATA, PERSONNEL SELECTION AND MANNING, ENGINE HARDWARE DESIGN, GROUND EQUIPMENT, ETC.
AD-286 912 DIV. 12

***GUIDED MISSILE RESEARCH**

COMPILATION OF UNPUBLISHED MATERIALS INFORMATION. SUMMARY OF CURRENT MATERIALS RESEARCH PROGRAM PLANS; COMBUSTION AND PRECOMBUSTION STUDIES OF LIQUID PROPELLANTS; COMPOSITE AND ABLATIVE MATERIALS; METALS; COATINGS; CERAMIC HONEYCOMB ELEMENTS; PLATING; WELDING; TEST METHODS WILL BE INCLUDED IN THE RESEARCH EFFORTS.
AD-287 098 DIV. 12

RADAR AND GUIDED MISSILE RESEARCH AT MIT LINCOLN LAB.
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***GUIDED MISSILE TRACKING SYSTEMS**

NRL SERVICES PROVIDED IN THE DEVELOPMENT OF TRI-SERVICE MISSILE RANGE RADAR INSTRUMENTATION.
AD-287 110 DIV. 12

***GUIDED MISSILE TRACKING SYSTEMS**
RADAR TRACKING

FEASIBILITY STUDY OF MISSILE TRAJECTORY MEASURING SYSTEM. DESCRIPTION AND OPERATION OF DOFL MISSILE TRACKING SYSTEM. DISCUSSION OF MIRAY SYSTEM VERSUS DOFL SYSTEM DESIGN.
AD-287 245 DIV. 12

***GUIDED MISSILE TRAJECTORIES**
MEASUREMENT

FEASIBILITY STUDY OF MISSILE TRAJECTORY MEASURING SYSTEM. DESCRIPTION AND OPERATION OF DOFL MISSILE TRACKING SYSTEM. DISCUSSION OF MIRAY SYSTEM VERSUS DOFL SYSTEM DESIGN.
AD-287 245 DIV. 12

***GUIDED MISSILES**
CONTAINERS

LISTING OF MILITARY REQUIREMENTS FOR MISSILE CONTAINER DESIGN.
AD-287 633 DIV. 12

***GUIDED MISSILES**
TEST FACILITIES

NRL SERVICES PROVIDED IN THE DEVELOPMENT OF TRI-SERVICE MISSILE RANGE RADAR INSTRUMENTATION.
AD-287 110 DIV. 12

***GUIDED MISSILES**
TRACKING

REVIEW OF SOVIET LITERATURE ON THE TRACKING OF MISSILES AND SPACE VEHICLES. SPECIFIC TOPICS ARE ION CLOUDS; IONOSPHERIC PERTURBATIONS AND RADIO ASTRONOMY.
AD-286 286 DIV. 6

***GUIDED MISSILES (STRATEGIC)**
MAINTENANCE

PERSONNEL SUBSYSTEM ANALYSIS OF THE ATLAS MA-3 PROPULSION SYSTEM. IDENTIFICATION OF 59 HUMAN FACTORS PROBLEMS RELATED TO SAFETY, TRAINING, ORGANIZATIONAL CONTROLS, TECHNICAL DATA, PERSONNEL SELECTION AND MANNING, ENGINE HARDWARE DESIGN, GROUND EQUIPMENT, ETC.
AD-286 912 DIV. 12

***GUIDED MISSILES (SURFACE-TO-SURFACE)**
MAINTENANCE

PERSONNEL SUBSYSTEM ANALYSIS OF THE ATLAS MA-3 PROPULSION SYSTEM. IDENTIFICATION OF 59 HUMAN FACTORS PROBLEMS RELATED TO SAFETY, TRAINING,

ORGANIZATIONAL CONTROLS; TECHNICAL DATA; PERSONNEL SELECTION AND MANNING; ENGINE HARDWARE DESIGN; GROUND EQUIPMENT; ETC.
AD-286 912 DIV. 12

*GUSTS

AN OBJECTIVE AID FOR FORECASTING STRONG AND GUSTY SURFACE WINDS AT GEIGER AFB, WASHINGTON.
AD-286 962 DIV. 2

*GYROSCOPES
USSR

A GYROSCOPE WITH A FLUID ROTOR.
AD-287 672 DIV. 19

*HAFNIUM ALLOYS

OXIDATION RESISTANCE OF MO BY ALLOYING WITH RARE EARTH AND OTHER SELECTED METALS. STUDIES OF SELECTIVE AND SACRIFICIAL OXIDATION TO FORM PROTECTIVE SCALE ON MOSOMHF, MO-15SHF AND MO-25%-HF ALLOYS, AT CHANGES WITH 25 AND 50 ATOMIC % ALLOYS SHOWED THAT THE SCALES CONTAINED A LARGE PERCENTAGE OF MOO3.
AD-287 429 DIV. 17

*HALL EFFECT

HALL EFFECT BRUSHLESS POTENTIOMETERS; LITERATURE SEARCH ON AVAILABLE DEVICES; THEORETICAL LIMITATIONS; QUALIFICATION TESTS; FABRICATION.
AD-287 533 DIV. 7

*HANDBOOKS
BEARINGS

DEVELOPMENT OF GAS LUBRICATED BEARINGS FOR USE IN BLOWER MOTORS. WORK ON THE FORMULATION OF A GAS BEARING DESIGN MANUAL TO BE USED FOR THE DESIGN OF GAS-LUBRICATED, SELF-ACTING JOURNAL AND THRUST BEARINGS FOR BLOWER MOTORS IS REPORTED.
AD-286 911 DIV. 26

*HANDBOOKS
RADIATION EFFECTS

THE SPACE RADIATION GUIDE IS PRESENTED TO PROVIDE FACTUAL DATA CURRENTLY KNOWN AND TO POINT OUT AREAS WHERE INFORMATION IS SKETCHY AND INCONCLUSIVE. COSMIC RAYS, SOLAR RADIATION AND THE GEOMAGNETICALLY TRAPPED RADIATIONS. INSTRUMENTS FOR MEASURING THESE RADIATIONS; SHIELDING TECHNIQUES; AND BIOLOGICAL EFFECTS.
AD-287 863 DIV. 32

*HARDENING

PERMANENT CHANGES PRODUCED IN THE MECHANICAL PROPERTIES OF ANNEALED STEELS (1015, 1090, 1050, AND 4130) BY MEANS OF CONTACT EXPLOSIVE CHARGES OF DIFFERENT THICKNESSES.
AD-287 201 DIV. 26

SHOCK-INDUCED HIGH DYNAMIC PRESSURES IN IRON-BASE ALLOYS. EXPLOSIVE SHOCK HARDENING INCREASED YIELD STRENGTH OF H-11 STEEL FROM 235 TO 340 KSI. WHILE 25# NI STEEL SHOWED YIELD STRENGTH INCREASES FROM 235 IN AUSTENITIZED-PLUS-AGED CONDITION TO 255 KSI IN SHOCKED-PLUS-AGED CONDITION.
AD-287 473 DIV. 17

*HARMONIC ANALYSIS

DETERMINATION OF MOMENTS OF INERTIA OF IRREGULAR NON-HOMOGENEOUS OBJECTS.
AD-287 534 DIV. 25

ASYMPTOTIC WORK DEVELOPMENT ON BEACHES OF NON-UNIFORM SLOPE.
AD-287 626 DIV. 15

*HEAT EXCHANGERS

EXPERIMENTAL INVESTIGATION OF HEAT EXCHANGE OF A PLATE WITH LONGITUDINAL AIR FLOW DIRECTED AROUND IT DIFFERS BY 8% FROM DATA CALCULATED BY FORMULAS.
AD-287 670 DIV. 25

EQUATIONS DEVELOPED FOR A TEMPERATURE FIELD OF A LIMITED BODY HAVING THE FORM OF PARALLELEPIPED WITH CONTINUOUSLY ACTIVE SOURCE OF HEAT.
AD-287 678 DIV. 25

A STUDY OF THE PROCESS OF CONVECTIVE HEAT TRANSFER IN WINDING SLIT CHANNELS. USSR SOURCE.
AD-287 717 DIV. 25

*HEAT RESISTANT ALLOYS
CORROSION

STRESS CORROSION OF 6AL4V TI, 18-NI MARAGING STEEL, 20-NI MARAGING STEEL, AND VACUUM-MELTED 9NI-4CO STEEL; PROTECTIVE COATINGS; BENT-BEAM, U-BEND, AND CENTER-NOTCH TEST METHODS.
AD-287 637 DIV. 17

*HEAT RESISTANT ALLOYS
FOILS

STATE-OF-THE-ART SURVEY. CAPABILITY OF INDUSTRY TO PRODUCE REFRACTORY METAL FOIL. SPECIFIC ALLOYS OF NB, TA AND W WERE RECOMMENDED AS CANDIDATES FOR ROLLING TO FOIL.
AD-287 403 DIV. 17

*HEAT RESISTANT ALLOYS
NICKEL ALLOYS

STRESS-RUPTURE TESTING OF CAST NICKEL ALLOYS AT 900 DEGREES. HIGH HEAT RESISTANCE IS OF INTEREST IN VIEW OF LONGER SERVICE PERIODS THAN THOSE REQUIRED IN AVIATION.
AD-287 671 DIV. 17

*HEAT RESISTANT GLASS

ANALYSIS OF FOAMGLAS INSULATION. REFRASIL B-100 BATT WAS RECOMMENDED FOR USE AS THERMAL INSULATION IN BORAL BOXES WHICH WILL BE USED IN HIGH TEMPERATURE RADIATION EFFECT STUDIES.
AD-286 986 DIV. 14

*HEAT RESISTANT PAINTS

DEVELOPMENT OF HEAT-RESISTANT PAINTS FOR METALS. HARD, WELL BONDED, HEAT AND WATER RESISTANT COATING WERE PRODUCED REPEATEDLY FROM A MIXTURE OF ZNO, DMMP, AND A DISPERSION OF COLLOIDAL SILICA WHEN CURED AT 72F AND 75% RH. PROPERTIES OF ZNO-DMMP-LEAP COATINGS CURED AT 72F AND VARIOUS RELATIVE HUMIDITIES VARIED ERRATICALLY.
AD-287 532 DIV. 14

*HEAT TRANSFER

SLOW FLOW OF A DISSOCIATED GAS ABOUT A CATALYTIC PROBE; A TECHNIQUE FOR MEASURING CATALYTIC EFFICIENCIES OF SURFACES AND DIFFUSION COEFFICIENTS OF A DISSOCIATED GAS.
AD-287 095 DIV. 25

A TRANSLATION ON THE DISTRIBUTION OF TEMPERATURE IN A HOLLOW INFINITE CYLINDER.
AD-287 679 DIV. 9

HEAT TRANSFER OF WAVE STRIPS IN A LONGITUDINA AIR STREAM INTENSIFIED BY ARTIFICIALLY RUINING THE BOUNDARY LAYER.
AD-287 698 DIV. 9

THE SUPERSONIC FLOW OF AN IDEAL GAS PAST A FLAT PLATE IN THE PRESENCE OF VOLUME HEAT TRANSFER IS PRESENTED.
AD-287 708 DIV. 9

A STUDY OF THE PROCESS OF CONVECTIVE HEAT TRANSFER IN WINDING SLIT CHANNELS. USSR SOURCE.
AD-287 717 DIV. 25

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AD-287 859 DIV. 2

*HEAT TRANSFER
LIQUID METALS

EXPERIMENTAL DATA ON THE VISCOSITY AND THERMAL CONDUCTIVITY OF LIQUID METALS (K, NA, SN, PB, BI AND HG).
AD-287 693 DIV. 25

*HELICAL ANTENNAS

A THEORETICAL AND EXPERIMENTAL INVESTIGATION ON ULTRA HIGH FREQUENCY AND VERY HIGH FREQUENCY ANTENNAS. EXPERIMENTAL RESULTS ON 6 DIFFERENT ANTENNA MODELS INCLUDING LOOP, SLOT, BICONICAL, AND SPIRAL ANTENNA TYPES.
AD-287 832 DIV. 8

*HELIUM

VISCOSITY OF SEVERAL GASES BY OSCILLATING DISK METHOD. MEASUREMENTS OF A, CO2, HE, NE AND N VISCOSITY BETWEEN 25 - 270 C AND PRESSURES OF 1 - 150 ATM. EMPIRICAL CORRELATIONS AND CORRELATIONS BASED ON A LENNARD-JONES 6-12 AND BUCKINGHAM EXP - 6 POTENTIAL ARE PRESENTED.
AD-287 471 DIV. 25

*HELIXES

HELICAL INSTABILITIES IN SOLID-STATE PLASMAS. SUCH INSTABILITIES ARISE WHEN A MAGNETIC FIELD IS APPLIED PARALLEL TO A CURRENT IN A SEMICONDUCTOR.
AD-287 753 DIV. 25

*HEMOPOIESIS

THE EFFECT ON HEMOPOIESIS OF INTERCURRENT STRESS IMPOSED PRECEDING RADIATION WAS INVESTIGATED IN THE MONKEY. THREE GROUPS OF MONKEYS WERE EXPOSED TO 200 R, 100 R AND 50 R OF WHOLE-BODY RADIATION. THE IRRADIATION WAS REPEATED 4 TIMES AT 80-DAY INTERVALS. THE ANIMALS RECEIVED AN ADDITIONAL STRESS IN THE FORM OF A PHLEBOTOMY BEFORE RADIATION. THE IMPAIRMENT AND SUBSEQUENT RECOVERY OF THE BONE MARROW WERE ASSESSED BY MEANS OF FE(59) UPTAKE AND REPEATED HEMATOGRAMS.
AD-287 076 DIV. 16

*HEPATITIS

DESTRUCTION OF CHIMPANZEE KIDNEY CELLS BY 2 OF 12 ACUTE SERA FROM PATIENTS WITH CLINICAL INFECTIOUS HEPATITIS. THE DESTRUCTIVE AGENT WAS OBSERVED IN FLUORESCENT ANTIBODY AND NEUTRALIZATION TESTS TO BE SEROLOGICALLY CROSS-REACTIVE WITH CONVALESCENT SERUM, AND WAS RESISTANT TO HEAT TREATMENT AT 56 C FOR 30 MIN.
AD-287 073 DIV. 16

*HETEROCYCLIC COMPOUNDS

HETEROLYTIC CONVERSION OF HEXAFLUOROHYDRAZOMETHANE CHEMICAL REACTIONS WITH OXIDIZING AND REDUCING AGENTS, AND NUCLEOPHILIC REAGENTS.
AD-287 716 DIV. 4

*HIGH ALTITUDE

MICROWAVE BREAKDOWN OF AIR AT HIGH ALTITUDES.
AD-287 907 DIV. 25

*HIGH FREQUENCY FILTERS

CRYSTAL FILTER TEST SET; HIGH FREQUENCY CRYSTAL FILTER TESTING IN THE RANGE 4.5-200 MC; COMPRESSION GAIN AMPLIFIERS DC OUTPUT VOLTAGE PROPORTIONAL TO AC INPUT AND COMPRESSION RATE; INSTRUMENTATION DESCRIBED.
AD-287 800 DIV. 8

*HIGH PRESSURE RESEARCH

RECRYSTALLIZATION AND HIGH PRESSURE-TEMPERATURE EFFECTS OF PHASE TRANSFORMATIONS IN POLYCRYSTALLINE CU; MOC; FE-NI ALLOYS; C ALLOYS; AND PLAIN C STEELS; EFFECT OF PRESSURE ON MECHANICAL PROPERTIES.
AD-287 200 DIV. 17

PRESSURE DISTRIBUTION IN OPPOSED ANVIL CONFIGURATIONS. EMPHASIS IN THIS STUDY WAS PLACED ON CALIBRATION OF SAMPLE BAFFLES MADE OF POWDER PRE-PELLETED INTO A METAL-CONTAINING RING. VARIABLES INCLUDED DIAMETER TO THICKNESS RATIO OF THE SAMPLE, SIZE AND MECHANICAL PROPERTIES OF THE RINGS; MECHANICAL PROPERTIES OF THE PRESSURE TRANSMITTING MEDIUM; TEMPERATURE.
AD-287 560 DIV. 30

*HIGH SPEED CAMERAS

ELECTRONICALLY CONTROLLED HIGH-SPEED STREAK CAMERA HAVING A MAGNETIC SUSPENSION AND DRIVE MECHANISM TO DRIVE A PRISMATIC-MIRROR ROTOR TO EXTREMELY HIGH ROTATIONAL VELOCITIES.
AD-287 531 DIV. 24

*HIGH TEMPERATURE RESEARCH

RECRYSTALLIZATION AND HIGH PRESSURE-TEMPERATURE EFFECTS OF PHASE TRANSFORMATIONS IN POLYCRYSTALLINE CU; MOC; FE-NI ALLOYS; C ALLOYS; AND PLAIN C STEELS; EFFECT OF PRESSURE ON MECHANICAL PROPERTIES.
AD-287 200 DIV. 17

A STUDY OF THE ATTENUATION PROPERTIES OF CERAMIC MATERIALS OVER 100 TO 12,000 MC/SEC AND FROM ROOM TEMPERATURE TO 2300F TO OBTAIN INFORMATION FOR DESIGNING ABSORBERS.
AD-287 900 DIV. 14

*HUMAN ENGINEERING

AN ATTEMPT TO ELUCIDATE THE MAJOR FACTORS AFFECTING THE DESIGN OF REMOTE OPERATIONS AND SUGGESTED CONTRIBUTIONS THAT HUMAN ENGINEERING MIGHT MAKE TO THE MORE EFFECTIVE DESIGN OF SUCH SYSTEMS. INCLUDES EXAMPLES OF REMOTE HANDLING OPERATIONS, ROBOTOLOGY, HUMAN ENGINEERING DESIGN AND STUDIES, AND A BIBLIOGRAPHY OF 55 REFERENCES.
AD-287 329 DIV. 28

*HUMAN ENGINEERING
GUIDED MISSILE LAUNCHERS

DETAILED RESULTS OF THE HUMAN FACTORS ENGINEERING REVIEW AND EVALUATION OF THE TITAN WEAPON SYSTEM 107A-2 LAUNCHER, OPERATIONAL BASE.
AD-287 795 DIV. 12

*HUMAN ENGINEERING
STRESS (PHYSIOLOGY)

A BIBLIOGRAPHY OF REPORTS ON THE EFFECTS OF AEROSPACE VEHICLE MOTION ON HUMAN PERFORMANCE; ACCELERATION, VIBRATION, BUFFETING, TUMBLING, AND WEIGHTLESSNESS.
AD-287 530 DIV. 16

*HYDRAULIC FLUIDS

IR SPECTRA OF SOME OILS, GREASES, ADDITIVES, AND RELATED MATERIALS. SPECTRA FROM 2 TO 16 MICRONS OF 82 OILS, GREASES, ADDITIVES AND

RELATED MATERIALS ARE PRESENTED AS AN AID IN THE QUALITATIVE IDENTIFICATION OF LUBRICANTS.
AD-287 756 DIV. 14

THE DESIGN OF A SHOCK AND VIBRATION EXCITER DRIVEN BY HYDRAULIC POWER IS DISCUSSED.
AD-287 846 DIV. 25

***HYDRAULIC SYSTEMS**

THE DESIGN OF A SHOCK AND VIBRATION EXCITER DRIVEN BY HYDRAULIC POWER IS DISCUSSED.
AD-287 846 DIV. 25

***HYDRAZINES**

AN ATTEMPT TO ESTABLISH THE EFFECTS OF PHENYLHYDRAZINE-INDUCED INTRAVASCULAR HEMOLYSIS ON THE STABLE IRON AND RADIOIRON CONTENT OF THE BLOOD FRACTIONS OF ANIMALS AFTER CELLULAR RADIOIRON INCORPORATION HAD APPROACHED AN ASYMPTOTE.
AD-287 065 DIV. 16

***HYDRODYNAMICS**

MATHEMATICAL SIMULATION OF STATIONARY SPACE EDDY HYDRODYNAMIC FIELDS OF INCOMPRESSIBLE FLUID BY USING A FLUCTUATING MAGNETIC FIELD WHERE THE BOUNDARIES ARE SET BY A MAGNETIC INSULATOR.
AD-287 673 DIV. 9

***HYDROFOIL BOATS**

TANDEM INTERFERENCE EFFECTS OF FLAT NON-CAVITATING HYDROFOILS.
AD-287 226 DIV. 31

FORMULATES A SET OF EQUATIONS WHICH WILL INCLUDE UNSTEADY LIFT FORCE REPRESENTATIONS, NON-LINEAR PRODUCT TERMS QUADRASH DUE TO GENERATED WAVES AND OTHER FACTORS THAT ARISE IN A COMPLETE CONSIDERATION. THESE WILL BE USED FOR PREDICTION OF MOTION OF HYDROFOIL CRAFT.
AD-287 510 DIV. 25

***HYDROFOILS**
HYDRODYNAMICS

TANDEM INTERFERENCE EFFECTS OF FLAT NON-CAVITATING HYDROFOILS.
AD-287 226 DIV. 31

***HYDROGEN**
CHEMICAL REACTIONS

KINETIC ANALYSIS OF THE REACTION OF H AND O IN SILENT ELECTRICAL DISCHARGE USING THE EQUATIONS OF IRREVERSIBLE FIRST-ORDER PARALLEL-CONSECUTIVE REACTIONS.
AD-287 696 DIV. 4

***HYDROGEN**
MATERIALS

FEASIBILITY STUDIES OF PD FILMS AS H DIFFUSION ELECTRODES IN FUEL CELLS; HYDROGEN TRANSPORT PROPERTIES; THERMODYNAMIC PROPERTIES.
AD-287 055 DIV. 7

***HYDROLOGY**

STATUS OF KNOWLEDGE OF GROUND WATER CONTAMINANTS. INCLUDED ARE A SUMMARY; OUTLINE OF THE INVESTIGATION; LITERATURE SUMMARY; AND SUPPLEMENTAL INFORMATION ON SELECTED CONTAMINANTS. A BIBLIOGRAPHY IS INCLUDED.
AD-286 931 DIV. 13

***HYPERSONICS**
SYMPOSIA

SYMPOSIA: SPACE VEHICLES AND SYSTEM DESIGN; HYPERSONICS AND RE-ENTRY; PROPULSION; STRUCTURES AND MATERIALS; MATHEMATICAL RELIABILITY TECHNIQUES.
AD-287 836 DIV. 12

***HYPERVELOCITY PROJECTILES**
IMPACT SHOCK

PARTICLE-SOLID IMPACT PHENOMENA; HIGH VELOCITY IMPACT TESTS WITH HIGH PURITY ALUMINUM AND COPPER PROJECTILES AND TARGETS AT VELOCITIES FROM 0.762 TO 7.62 KM/SEC.
AD-287 808 DIV. 9

***ICE**

COLD REGIONS SCIENCE AND ENGINEERING. PART II, PHYSICAL SCIENCE. SECTION B. THE PHYSICS AND MECHANICS OF SNOW AS A MATERIAL.
AD-287 052 DIV. 2

***ICE**
ENGINEERING

A TECHNICAL DISCUSSION OF SITE SELECTION AND ENGINEERING ASPECTS OF CONSTRUCTION ACTIVITIES, TOGETHER WITH TECHNICAL EVALUATION OF OPERATIONAL EXPERIENCE. A VARIETY OF STUDIES OF SEA-ICE STRENGTH, MECHANICAL PROPERTIES, SALINITY, DEFORMATION, AND DETERIORATION CHARACTERISTICS WERE INVESTIGATED ALONG WITH THE OPERATIONAL TESTS.
AD-287 604 DIV. 1

***ICONOSCOPES**

A COMPARISON OF IMAGE ORTHICONS AND IMAGE ISOCONS. IMAGE ISOCON PROVIDED OUTPUT SIGNAL OF HIGHER AMPLITUDE AND LESS NOISE CONTENT.
AD-287 223 DIV. 8

***ILLUMINATION**

APPLICATION OF MODIFIED ZERNIKE POLYNOMIALS TO THE ANALYSIS OF FRESNEL-REGION FIELDS OF CIRCULAR APERTURES WITH NON-UNIFORM AND NON-SYMMETRIC ILLUMINATION.
AD-287 829 DIV. 8

***ILLUMINATION**
DISTRIBUTION

APPLICABILITY OF THE BIENER-SPENCER THEOREM TO ANTENNAS.
AD-287 778 DIV. 8

***IMAGE CONVERTER TUBES**

A PORTABLE LOW-LEVEL LIGHTMETER USING AN INFRARED IMAGE CONVERTER TUBE TO CONVERT INFRARED INTO VISIBLE RADIATION WHICH REGISTERS THE BRIGHTNESS OF THE NIGHT SKY IN THE NEAR INFRARED.
AD-287 877 DIV. 25

MODIFIED PORTABLE LOW-LEVEL LIGHTMETER FOR THE NEAR INFRARED WHICH USES AN EXPERIMENTAL PHOTOMULTIPLIER TUBE TO INCREASE SENSITIVITY.
AD-287 880 DIV. 25

***IMAGE INTENSIFIERS (ELECTRONICS)**

A COMPARISON OF IMAGE ORTHICONS AND IMAGE ISOCONS. IMAGE ISOCON PROVIDED OUTPUT SIGNAL OF HIGHER AMPLITUDE AND LESS NOISE CONTENT.
AD-287 223 DIV. 8

***IMPACT SHOCK**

THEORIES OF FRACTURE IN PLASTICS AND SHOCK LOADING IN SOLIDS; IMPACT VELOCITIES FOR THRESHOLD FRACTURE; EQUATION OF STATE; FRACTURE MECHANICS.
AD-287 214 DIV. 14

THE DESIGN OF A SHOCK AND VIBRATION EXCITER DRIVEN BY HYDRAULIC POWER IS DISCUSSED.
AD-287 846 DIV. 25

***IMPEDANCE**

CONSIDERS THE EQUALIZATION OF THE VOLTAGE OF A CURRENT SOURCE, LOADED BY A PARALLEL NETWORK, ACROSS THE TERMINALS OF THE LOAD BY MEANS OF A LUMPED LOSSLESS, ONE-POINT IMPEDANCE, SHUNTED ACROSS THE LOAD TERMINALS.
AD-287 470 DIV. 25

CHARACTERISTIC IMPEDANCE OF RECTANGULAR COAXIAL TRANSMISSION LINES. THE CORNER CAPACITANCE.
AD-287 535 DIV. 8

***IMPINGERS**

MARK II PARTICHROME PROCESSOR AND MARK III PARTICHROME SCANNER. AUTOMATIC STEPWISE COLLECTION AND STAINING OF AIRBORNE BACTERIA ON TRANSPARENT TAPE AS WELL AS AUTOMATIC SCANNING OF TRANSPARENT TAPES WITH CARBON PARTICLES AND STAINED ORGANISMS WITH AN ACCURACY OF 0.1% HAS DEMONSTRATED.
AD-287 770 DIV. 3

***INDOLES**

THE TOXIC EFFECTS ON MONKEYS, RATS, AND MICE OF LONG TERM CONTINUOUS EXPOSURE TO FOUR COMPOUNDS WHICH MIGHT BE EXPECTED TO ACCUMULATE WITHIN A SPACE VEHICLE--METHYL MERCAPTAN, HYDROGEN SULFIDE, INDOLE, AND SKATOLE--ARE DETERMINED FOR THE COMPOUNDS INDIVIDUALLY AND AS A MIXTURE.
AD-287 797 DIV. 16

***INFECTIONS**

MACACA MULATTA MONKEYS GIVEN A SINGLE DOSE OF APPROXIMATELY 725 R OF TOTAL-BODY COBALT GAMMA RADIATION. BLOOD CULTURES ON SACRIFICED ANIMALS WERE NEGATIVE EXCEPT FOR ONE ANIMAL 8 DAYS POSTIRRADIATION. TABLES INDICATING TYPE OF ORGANISMS AND ORGANS INVADED ARE GIVEN.
AD-287 084 DIV. 16

***INFORMATION RETRIEVAL**
LANGUAGE

STUDIES AND ANALYSES OF INFORMATION (DOCUMENT) RETRIEVAL FUNCTIONS CONCERNED WITH STORAGE AND MAINTENANCE OF MASTER FILE AND PROCESSING OF SEARCH REQUESTS.
AD-287 117 DIV. 32

***INFORMATION THEORY**
NERVOUS SYSTEM

FUSION FREQUENCY FOR STIMUL. OF ALTERNATING DURATIONS. A MATHEMATICAL MODEL FOR COLOR CONSTANCY. AN APPROACH TO COMPUTERS THAT PERCEIVE, LEARN, AND REASON. IN SEARCH OF THE FUNDAMENTAL UNITS OF PERCEPTION. FORMATION OF CELL ASSEMBLIES. MATHEMATICAL MODELS FOR NEURAL INTERACTING. MODEL FOR CONDITIONING AND THE EFFECT OF SPACED TRACTS IN LEARNING. A CANONICAL FORM FOR NERVE NETS WITHOUT CIRCLES.
AD-287 857 DIV. 28

***INFRARED DETECTORS**

GAS CELL PHASE SHIFTER DEVELOPMENT AND TESTING. A PHOTOMULTIPLIER FRINGE DETECTION SYSTEM ADAPTED TO A TWYMAN-GREEN INTERFEROMETER IS USED TO CALIBRATE THE PHASE SHIFTER.
AD-287 211 DIV. 8

***INFRARED IMAGE TUBES**

A PORTABLE LOW-LEVEL LIGHTMETER USING AN INFRARED IMAGE CONVERTER TUBE TO CONVERT INFRARED INTO VISIBLE RADIATION WHICH REGISTERS THE BRIGHTNESS OF THE NIGHT SKY IN THE NEAR INFRARED.
AD-287 877 DIV. 25

MODIFIED PORTABLE LOW-LEVEL LIGHTMETER FOR THE NEAR INFRARED WHICH USES AN EXPERIMENTAL PHOTOMULTIPLIER TUBE TO INCREASE SENSITIVITY.
AD-287 880 DIV. 25

***INFRARED IMAGES**

THE FEASIBILITY OF USING AN ISOTHERMAL TWO-PHASE SYSTEM FOR THERMAL IMAGING DETECTION.
AD-287 746 DIV. 6

A SURVEY OF ISOTHERMAL IMAGING METHODS IS PRESENTED.
AD-287 748 DIV. 6

***INFRARED OPTICAL MATERIALS**

EVALUATION OF IR TRANSMITTING GLASSES SELECTED FROM THE AS-SE-TE FIELD. SUBSTITUTION AND INCORPORATION OF AG, BI, TE, CU, SB, CU, AND SB IN AS-SE GLASSES.
AD-286 980 DIV. 25

***INFRARED RADIATION**

RESULTS OF ELECTROPHOTOMETRIC OBSERVATIONS OF THE OI, NA, AND OH EMISSIONS AND THE CONTINUUM IN THE AIRGLOW.
AD-287 710 DIV. 2

THE FEASIBILITY OF USING AN ISOTHERMAL TWO-PHASE SYSTEM FOR THERMAL IMAGING DETECTION.
AD-287 746 DIV. 6

A SURVEY OF ISOTHERMAL IMAGING METHODS IS PRESENTED.
AD-287 748 DIV. 6

***INFRARED RADIATION**
ABSORPTION

IR ABSORPTION BY CO2, WATER VAPOR, AND MINOR ATMOSPHERIC CONSTITUENTS. INCLUDES 3 PREVIOUSLY PUBLISHED REPORTS ON (1) ABSORPTION BY N2O, CO AND CH4; (2) ABSORPTION BY CO2; (3) ABSORPTION BY WATER VAPOR AND H2O.
AD-287 406 DIV. 25

***INFRARED RADIATION**
TERRAIN

INFRARED EMISSIVITY; ATMOSPHERIC OPTICAL NOISE MEASUREMENT.
AD-287 517 DIV. 6

***INFRARED SPECTROSCOPY**

WORK WAS CONFINED TO REVISION OF THE SPECTROMETER AND THE INDEX OF REFRACTION AND THE EXTINCTION COEFFICIENT OF CRYSTALS; THE DATA OBTAINED IS NOT LISTED.
AD-287 567 DIV. 25

***INFRARED SPECTROSCOPY**
ISOTOPES

ANALYSIS OF LOW FREQUENCY IR ABSORPTION. EFFECT OF CL-37 ON THE IR.
AD-287 983 DIV. 4

***INFRARED SPECTROSCOPY**
KETONES

IR SPECTRA OF SELECTED KETONES, ETHERS AND

ALCOHOLS BETWEEN 15 AND 35 MICRONS. SPECTRA OF KETONES IN THIS MICRON REGION ARE VERY INFORMATIVE OF THEIR DETAILED STRUCTURAL FEATURES AND DISTINGUISH BETWEEN ALIPHATIC METHYL KETONES, KETONES WITH AND WITHOUT ALPHA BRANCHING, AROMATIC METHYL KETONES AND CYCLIC KETONES.
AD-287 735 DIV. 4

*INFRARED SPECTROSCOPY
LUBRICANTS

IR SPECTRA OF SOME OILS, GREASES, ADDITIVES, AND RELATED MATERIALS. SPECTRA FROM 2 TO 14 MICRONS OF 82 OILS, GREASES, ADDITIVES AND RELATED MATERIALS ARE PRESENTED AS AN AID IN THE QUALITATIVE IDENTIFICATION OF LUBRICANTS.
AD-287 736 DIV. 14

*INFRARED TRANSMITTERS

EVALUATION OF IR TRANSMITTING GLASSES SELECTED FROM THE AS-SE-TE FIELD. SUBSTITUTION AND INCORPORATION OF AG, BI, TE, CD, GE, CU, AND SB IN AS-SE GLASSES.
AD-286 989 DIV. 25

*INSTRUMENTATION
TEST EQUIPMENT

NEW TECHNIQUES ARE DESCRIBED FOR FAULT LOCATION ON OPEN WIRE TRANSMISSION LINES, IN-CIRCUIT TESTING OF TRANSISTORS, AND SINGLE-SIDEBAND INTERMODULATION DISTORTION REDUCTION.
AD-287 614 DIV. 30

*INSTRUMENTATION
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NRL SERVICES PROVIDED IN THE DEVELOPMENT OF TRI-SERVICE MISSILE RANGE RADAR INSTRUMENTATION.
AD-287 119 DIV. 12

*INSTRUMENTATION
USSR

QUALITY OF SOVIET MEASURING INSTRUMENTS.
AD-287 389 DIV. 30

*INTEGRAL EQUATIONS

ON THE STABILITY OF VISCOUS FLOW BETWEEN ROTATING CYLINDERS. NUMERICAL ANALYSIS.
AD-287 625 DIV. 9

STABLE, PHYSICALLY REALIZABLE, LINEAR, TIME-INVARIANT SYSTEMS.
AD-287 786 DIV. 30

*INTEGRAL TRANSFORMS

STABLE, PHYSICALLY REALIZABLE, LINEAR, TIME-INVARIANT SYSTEMS.
AD-287 786 DIV. 30

*INTERMETALLIC COMPOUNDS

RADIATION DECAY IN SOLIDS AND REACTOR MATERIALS; USSR SOURCE.
AD-287 692 DIV. 20

*INVERTED RECTIFIERS

HIGH-CURRENT TUNNEL DIODES OF GERMANIUM, SILICON, AND GALLIUM ARSENIDE. SILICON WAS INFERIOR TO GERMANIUM AND GALLIUM ARSENIDE.
AD-287 463 DIV. 8

*INVERTER CIRCUITS

HIGH-CURRENT TUNNEL DIODES OF GERMANIUM, SILICON, AND GALLIUM ARSENIDE. SILICON WAS INFERIOR TO GERMANIUM AND GALLIUM ARSENIDE.
AD-287 463 DIV. 8

*ION ACCELERATORS

AN ANALYSIS IS PRESENTED ON THE MAIN METHODS USED TO DETERMINE PHYSICAL DATA WHICH CHARACTERIZE THE HIGH SPEED MOLECULAR BEAM, AND IN PARTICULAR, THE SPEED OF MOLECULES AND THE EFFICIENCY OF THE EXCHANGE PROCESSES.
AD-287 761 DIV. 25

*IONIZATION

THE THEORY AND DESIGN OF A SUPERSONIC COLD PLASMA BEAM OF ALKALI METAL VAPOR.
AD-286 910 DIV. 25

SIMPLEST PROBLEMS INVOLVING A GAS-IONIZING SHOCK WAVE IN AN ELECTROMAGNETIC FIELD.
AD-287 688 DIV. 9

*IONIZATION CHAMBERS

RESULTS OF AN ENERGY RESPONSE OF LANDSVERK POCKET CHAMBERS USING MONOENERGETIC GAMMA-EMITTING RADIOISOTOPES.
AD-287 202 DIV. 25

*IONOSPHERE

IRREGULARITIES IN THE IONOSPHERE.
AD-287 276 DIV. 2

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AD-287 858 DIV. 2

*IONOSPHERE
RADIO TRANSMISSION

A METHOD OF DECREASING THE ELECTRON DENSITY IN THE IONOSPHERIC D-REGION BY MEANS OF HEATING THE ELECTRONS USING INTENSE ELECTROMAGNETIC RADIATION FROM HIGH-POWERED GROUND-BASED TRANSMITTERS.
AD-287 186 DIV. 8

*IONOSPHERIC DISTURBANCES

REVIEW OF SOVIET LITERATURE ON THE TRACKING OF MISSILES AND SPACE VEHICLES. SPECIFIC TOPICS ARE ION CLOUDS, IONOSPHERIC PERTURBATIONS AND RADIO ASTRONOMY.
AD-287 286 DIV. 6

*IONOSPHERIC PROPAGATION

A METHOD OF DECREASING THE ELECTRON DENSITY IN THE IONOSPHERIC D-REGION BY MEANS OF HEATING THE ELECTRONS USING INTENSE ELECTROMAGNETIC RADIATION FROM HIGH-POWERED GROUND-BASED TRANSMITTERS.
AD-287 186 DIV. 8

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AN ANALYSIS IS PRESENTED ON THE MAIN METHODS USED TO DETERMINE PHYSICAL DATA WHICH CHARACTERIZE THE HIGH SPEED MOLECULAR BEAM, AND IN PARTICULAR, THE SPEED OF MOLECULES AND THE EFFICIENCY OF THE EXCHANGE PROCESSES.
AD-287 761 DIV. 25

*IRON ALLOYS

RECRYSTALLIZATION AND HIGH PRESSURE-TEMPERATURE EFFECTS OF PHASE TRANSFORMATIONS IN POLYCRYSTALLINE CU, MO, FE-NI ALLOYS, C ALLOYS, AND PLAIN C STEELS, EFFECT OF PRESSURE ON MECHANICAL PROPERTIES.
AD-287 200 DIV. 17

SHOCK-INDUCED HIGH DYNAMIC PRESSURES ON IRON-BASE ALLOYS. EXPLOSIVE SHOCK HARDENING INCREASED YIELD STRENGTH OF H-11 STEEL FROM 235 TO 340 KSI, WHILE 25% NI STEEL SHOWED YIELD STRENGTH INCREASES FROM 235 IN AUSTENITIZED-PLUS-AGED CONDITION TO 255 KSI IN SHOCKED-PLUS-AGED CONDITION.
AD-287 473 DIV. 17

*IRON COMPOUNDS

RADIATION DECAY IN SOLIDS AND REACTOR MATERIALS; USSR SOURCE.
AD-287 692 DIV. 20

*IRREVERSIBLE PROCESSES

A SUMMARY AND REVISION OF EXISTING THEORY ON CONVENTIONAL THERMOCOUPLES.
AD-287 833 DIV. 25

*ISOTOPES

ALTIMETER DEVICES WHOSE OPERATION IS BASED ON INTERACTION OF RADIATION FROM SELECTED RADIOISOTOPES WITHIN THE ATMOSPHERE.
AD-286 925 DIV. 25

RESULTS OF AN ENERGY RESPONSE OF LANDSVERK POCKET CHAMBERS USING MONOENERGETIC GAMMA-EMITTING RADIOISOTOPES.
AD-287 202 DIV. 25

*JATOS

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AD-287 661 DIV. 27

*JET ACOUSTIC OSCILLATIONS

FORCED VIBRATIONS OF AN ELASTIC CIRCULAR BODY OF FINITE LENGTH SUBMERGED IN AN ACOUSTIC FLUID. PRESSURE AND VELOCITY FIELDS WHICH ARE PRODUCED IN THE FLUID BY HARMONIC EXCITATION OF AN ELASTIC CIRCULAR CYLINDRICAL BODY ARE EVALUATED. A POTENTIAL THEORY IS USED.
AD-286 905 DIV. 9

*JET ENGINE NOISE

SYNCHROPHASING OF PROPELLER BLADES OF MULTI-ENGINE AIRCRAFT BY AUTOMATION.
AD-287 730 DIV. 1

*JET PLANES
AERODYNAMIC CONFIGURATIONS

AIR DESIGN PARAMETERS FOR JET PLANES. USSR TRANSLATION.
AD-287 668 DIV. 1

*JET PLANES
TAKE-OFF

RUNWAY SLUSH EFFECTS ON TAKEOFF AND BRAKING OF A JET TRANSPORT, USING THE CONVAIR 880.
AD-287 892 DIV. 1

*JET PROPULSION

FLUID MECHANICS, TRANSPORT AND TRANSFER PROCESSES, CHEMICAL KINETICS, COMBUSTION PHENOMENA.
AD-286 904 DIV. 10

*JETTISONABLE COCKPITS

TRACK TESTS OF JETTISONABLE COCKPITS FOR F-102.
AD-287 281 DIV. 1

*JOURNAL BEARINGS

DEVELOPMENT OF GAS LUBRICATED BEARINGS FOR USE IN BLOWER MOTORS. WORK ON THE FORMULATION OF A GAS BEARING DESIGN MANUAL TO BE USED FOR THE DESIGN OF GAS-LUBRICATED, SELF-ACTING JOURNAL AND THRUST BEARINGS FOR BLOWER MOTORS IS REPORTED.
AD-286 911 DIV. 26

ANALYSIS OF PLAIN CYLINDRICAL JOURNAL BEARINGS IN TURBULENT REGIME. STEADY STATE LOAD CARRYING CAPACITY, ATTITUDE ANGLE AND FLUID FILM STIFFNESS OF THE BEARINGS WERE INVESTIGATED.
AD-287 899 DIV. 26

*KETONES

IR SPECTRA OF SELECTED KETONES, ETHERS AND ALCOHOLS BETWEEN 15 AND 35 MICRONS. SPECTRA OF KETONES IN THIS MICRON REGION ARE VERY INFORMATIVE OF THEIR DETAILED STRUCTURAL FEATURES AND DISTINGUISH BETWEEN ALIPHATIC METHYL KETONES, KETONES WITH AND WITHOUT ALPHA BRANCHING, AROMATIC METHYL KETONES AND CYCLIC KETONES.
AD-287 735 DIV. 4

*KIDNEYS
TESTS

A COMPARISON OF INULIN AND CREATININE CLEARANCES FOR ESTIMATING GLOMERULAR FILTRATION RATE IN MAN.
AD-287 853 DIV. 16

*LABORATORY EQUIPMENT

THE THEORY AND DESIGN OF A SUPERSONIC COLD PLASMA BEAM OF ALKALI METAL VAPOR.
AD-286 910 DIV. 25

PRESSURE DISTRIBUTION IN OPPOSED ANVIL CONFIGURATIONS. EMPHASIS IN THIS STUDY WAS PLACED ON CALIBRATION OF SAMPLE WAFERS MADE OF POWDER PRE-PELLETED INTO A METAL-CONTAINING RING. VARIABLES INCLUDED DIAMETER TO THICKNESS RATIO OF THE SAMPLE, SIZE AND MECHANICAL PROPERTIES OF THE RINGS, MECHANICAL PROPERTIES OF THE PRESSURE TRANSMITTING MEDIUM, TEMPERATURE.
AD-287 560 DIV. 30

*LANDING FIELDS
CONSTRUCTION

A TECHNICAL DISCUSSION OF SITE SELECTION AND ENGINEERING ASPECTS OF CONSTRUCTION ACTIVITIES, TOGETHER WITH TECHNICAL EVALUATION OF OPERATIONAL EXPERIENCE. A VARIETY OF STUDIES OF SEA-ICE STRENGTH, MECHANICAL PROPERTIES, SALINITY, DEFORMATION, AND DETERIORATION CHARACTERISTICS WERE INVESTIGATED ALONG WITH THE OPERATIONAL TESTS.
AD-287 604 DIV. 1

*LANGUAGE

SYNTACTIC ANALYSIS AND OPERATOR PRECEDENCE. THE CONSTRUCTION OF A COMPILER FOR A NON-TRIVIAL PROGRAMMING LANGUAGE IS TREATED.
AD-287 553 DIV. 32

*LASERS

GAS CELL PHASE SHIFTER DEVELOPMENT AND TESTING. A PHOTOMULTIPLIER ENIGMA DETECTION SYSTEM ADAPTED TO A TWYMAN-GREEN INTERFEROMETER IS USED TO CALIBRATE THE PHASE SHIFTER.
AD-287 211 DIV. 6

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AD-287 725 DIV. 18

*LASERS
RUBY

RUBY IMPROVEMENT FOR LASERS. DESCRIPTION OF EQUIPMENT AND TECHNIQUES. TEST PROCEDURE.
AD-287 882 DIV. 25

*LASERS
USSR

TRANSLATION OF A PATENT FOR A LASER WHICH APPEARED IN THE OFFICIAL SOVIET PATENT ORGANIZATION.
AD-287 288 DIV. 8

*LEARNING

A REINFORCER SYSTEM AND EXPERIMENTAL PROCEDURE FOR THE LABORATORY STUDY OF READING ACQUISITION BY FOUR YEAR OLD CHILDREN.
AD-287 802 DIV. 28

*LEUKOCYTES
HISTOLOGY

CHROMOSOMAL ANALYSES OF BLOOD CELLS AFTER SHORT TERM CULTURE WERE COMPARED WITH THE ABERRATIONS INDUCED BY IRRADIATION FROM A COBALT-60 SOURCE. CHROMOSOMAL BREAKAGES OF FRAGMENTS, DICENTRICS AND ENDOREDUPLICATIONS WERE NOTED.
AD-287 067 DIV. 16

*LIBRARIES
ORDNANCE LABORATORIES

PROCEEDINGS OF THIRD ORDNANCE LIBRARIANS' WORKSHOP, 31 MARCH-1 APRIL 1960. TECHNICAL REPORT MANUAL. INFORMATION PROCESSING OFFICES. PROCUREMENT, PURCHASING AND ACQUISITION. RELATIONSHIP OF PHYSICAL SCIENCE ANALYST TO ORDNANCE TECHNICAL LIBRARIES. CATALOGING, CLASSIFICATION AND DISTRIBUTION. STANDARDIZATION OF PROCEDURES. INTERDEPARTMENTAL AND DEPARTMENT COOPERATION AND REGULATORY PROCEDURES.
AD-287 189 DIV. 32

*LIBRARY SCIENCE
ORDNANCE LABORATORIES

PROCEEDINGS OF THIRD ORDNANCE LIBRARIANS' WORKSHOP, 31 MARCH-1 APRIL 1960. TECHNICAL REPORT MANUAL. INFORMATION PROCESSING OFFICES. PROCUREMENT, PURCHASING AND ACQUISITION. RELATIONSHIP OF PHYSICAL SCIENCE ANALYST TO ORDNANCE TECHNICAL LIBRARIES. CATALOGING, CLASSIFICATION AND DISTRIBUTION. STANDARDIZATION OF PROCEDURES. INTERDEPARTMENTAL AND DEPARTMENT COOPERATION AND REGULATORY PROCEDURES.
AD-287 189 DIV. 32

*LIGHT

NEW TECHNIQUES FOR PRECISION MEASUREMENT OF LIGHT PHOTOELASTICITY.
AD-287 606 DIV. 25

*LIGHT COMMUNICATION SYSTEMS
SPACE FLIGHT

OPTICAL SPECTRAL REGIONS FOR SPACE COMMUNICATIONS.
AD-287 640 DIV. 5

*LIGHT TRANSMISSION

LIGHT TRANSMITTANCE VS. WAVELENGTH OF 6 F 100 CANOPY WINDOW SAMPLES.
AD-287 619 DIV. 14

*LIGHTING SYSTEMS
AIRPORTS

ACTIVITY REPORT ON AIRPORT FACILITY INCLUDING TRAFFIC CONTROL, DISPLAY SYSTEMS, LIGHTING, COMMUNICATION, LANDING SYSTEMS.
AD-287 658 DIV. 1

*LINEAR PROGRAMMING

AN ANALYSIS IS PRESENTED WHICH DESCRIBES AN ALGORITHM FOR APPLYING LINEAR PROGRAMMING TO THE PROBLEM OF DETERMINING WHETHER OR NOT A GIVEN FUNCTION IS LINEARLY SEPARABLE, AND IF SO, WHAT ARE THE WEIGHTS AND THRESHOLD VALUES REQUIRED TO FORM THE SEPARATING SYSTEM.
AD-286 978 DIV. 8

*LINEAR SYSTEMS

A COMPARISON OF DIFFERENT MODES OF REPRESENTATION OF MULTIVARIATE SYSTEMS.
AD-287 030 DIV. 30

RESULTS IN THE THEORY OF ACTIVE NETWORKS, BOUNDS ON THE FLOQUET EXPONENTS OF SYSTEMS CREATED BY EMBEDDING LINEAR PERIODIC ELEMENTS IN PASSIVE NETWORKS.
AD-287 611 DIV. 8

MOTION OF WATER ON A UNIFORMLY SLOPING BEACH JUST AFTER A WAVE REACHES THE SHORE.
AD-287 627 DIV. 2

*LIQUID METALS

LIQUID METAL EMBRITTLEMENT OF A CU-2% BE ALLOY. PROPENSITY TOWARD BRITTLE FRACTURE IN THE PRESENCE OF A 2% NA AMALGAM WAS INVESTIGATED. RESULTS CORRELATED FRACTURE STRENGTH IN THE LIQUID METAL ENVIRONMENT WITH THERMAL-MECHANICAL HISTORY.
AD-287 255 DIV. 17

EXPERIMENTAL DATA ON THE VISCOSITY AND THERMAL CONDUCTIVITY OF LIQUID METALS (K, NA, SN, PB, BI AND HG).
AD-287 693 DIV. 25

*LIQUID ROCKET PROPELLANTS
GUIDED MISSILE RESEARCH

COMPILATION OF UNPUBLISHED MATERIALS INFORMATION. SUMMARY OF CURRENT MATERIALS RESEARCH PROGRAM PLANS. COMBUSTION AND PRECOMBUSTION STUDIES OF LIQUID PROPELLANTS. COMPOSITE AND ABLATIVE MATERIALS. METALS. COATING. CERAMIC HONEYCOMB ELEMENTS. PLATING. WELDING. TEST METHODS WILL BE INCLUDED IN THE RESEARCH EFFORTS.
AD-287 098 DIV. 12

*LITHIUM

LATENT HEAT OF VAPORIZATION OF ALKALI METALS. ELASTICITY DATA. SPECIFIC HEATS OF VAPORIZATION FOR LI, NA AND K.
AD-287 720 DIV. 4

*LIVER
DISEASES

ACUTE HEPATIC INJURY AND PROCESSES LEADING TO RECOGNITION OF THE FACTORS DETERMINING CHRONICITY SUCH AS FIBER FORMATION AND IMMUNOLOGIC HEPATIC INJURY. ALTERATIONS OF THE HEPATOCELLULAR SYNTHESIZING AND ENERGY PROVIDING APPARATUS AND THOSE OF THE BILE SECRETORY AND TRANSPORT MECHANISM. IN THE IMMUNOLOGIC STUDY OF LIVER DISEASES, HEPATIC FORMATION OF GAMMA GLOBULIN AND SPECIFIC CIRCULATING ANTIBODIES TO LIVER WERE DEMONSTRATED.
AD-287 566 DIV. 10

*LOAD DISTRIBUTION

LOAD DEFLECTION CHARACTERISTICS OF FAB 264 (LAYERED CLOTH IMPREGNATED WITH RUBBER) AT ROOM TEMPERATURE AND 0 F.
AD-287 824 DIV. 14

*LOOP ANTENNAS

A THEORETICAL AND EXPERIMENTAL INVESTIGATION ON ULTRA HIGH FREQUENCY AND VERY HIGH FREQUENCY ANTENNAS. EXPERIMENTAL RESULTS ON 6 DIFFERENT ANTENNA MODELS INCLUDING LOOP, SLOT, BICONICAL, AND SPIRAL ANTENNA TYPES.
AD-287 832 DIV. 8

*LOW TEMPERATURE BATTERIES

LOW TEMPERATURE BA-2270/U-ALT-I BATTERIES. TWENTY-FOUR MONTHS DELAYED TESTING FOR THE LICL-ICP-2 LOW TEMPERATURE LECLANCHE SYSTEM. DISCHARGE TESTS WERE RUN AT 70, -20 AND -40 F AFTER 24 MONTHS STORAGE. ELECTROLYTE LEAKAGE, PREFERENTIAL ZINC CORROSION AND OTHER FACTORS AFFECTING PERFORMANCE ARE DISCUSSED.
AD-287 869 DIV. 7

*LUBRICANT ADDITIVES

IR SPECTRA OF SOME OILS, GREASES, ADDITIVES, AND RELATED MATERIALS. SPECTRA FROM 2 TO 16 MICRONS OF 82 OILS, GREASES, ADDITIVES AND RELATED MATERIALS ARE PRESENTED AS AN AID IN THE QUALITATIVE IDENTIFICATION OF LUBRICANTS.
AD-287 756 DIV. 14

*LUBRICANTS
INFRARED SPECTROSCOPY

IR SPECTRA OF SOME OILS, GREASES, ADDITIVES, AND RELATED MATERIALS. SPECTRA FROM 2 TO 16 MICRONS OF 82 OILS, GREASES, ADDITIVES AND RELATED MATERIALS ARE PRESENTED AS AN AID IN THE QUALITATIVE IDENTIFICATION OF LUBRICANTS.
AD-287 756 DIV. 14

*LUBRICANTS
METALS

FRICTION AND WEAR AT ELEVATED TEMPERATURES. A NUMBER OF SUBSTANCES WERE EXAMINED FOR SUITABILITY UNDER SLIDING CONDITIONS IN THE RANGE FROM ROOM TEMPERATURE TO 2000F. INFORMATION FROM FRICTION-TEMPERATURE RUNS IS DISCUSSED.
AD-287 458 DIV. 17

*LUBRICATION

ANALYSIS OF PLAIN CYLINDRICAL JOURNAL BEARINGS IN TURBULENT REGIME. STEADY STATE LOAD CARRYING CAPACITY, ATTITUDE ANGLE AND FLUID FILM STIFFNESS OF THE BEARINGS WERE INVESTIGATED.
AD-287 899 DIV. 26

*LUNAR PROBES

SURVEY OF ASTRO-PHYSICAL ACTIVITIES AT KAZAKHSTAN ACADEMY OF SCIENCES.
AD-287 705 DIV. 2

*MACHINES
DESIGN

PRODUCTION ENGINEERING MEASURE FOR TUBE TYPE 7587.
AD-287 662 DIV. 31

*MAGNESIUM
OXIDATION

KINETICS OF HIGH TEMPERATURE REACTION BETWEEN MG POWDER AND O WERE INVESTIGATED. RESULTS WERE INTERPRETED IN TERMS OF 3 RATE PROCESSES: (1) ADSORPTION OF O ON SURFACE OF THE PARTICLE; (2) DISSOCIATION OF ADSORBED O; (3) REACTION BETWEEN ATOMIC O AND MG AT THE OXIDE-METAL INTERFACE. A THEORETICAL RATE EQUATION WAS DERIVED.
AD-287 730 DIV. 4

*MAGNETIC DRIVES

A MAGNETIC DRIVE FOR PRODUCING ROTATIONAL MOTION IN VACUUM APPARATUS. SOVIET PATENT.
AD-287 706 DIV. 7

*MAGNETIC FIELDS

RADIATION FROM A LINE SOURCE IN A UNIAXIALLY ANISOTROPIC PLASMA.
AD-287 036 DIV. 8

A SURVEY IS PRESENTED OF PHENOMENA IN MAGNETO-HYDRODYNAMICS FROM THE STANDPOINT OF GEOMETRICAL HYDROMAGNETICS.
AD-287 481 DIV. 25

MATHEMATICAL SIMULATION OF STATIONARY SPACE EDDY HYDRODYNAMIC FIELDS OF INCOMPRESSIBLE FLUID BY USING A FLUCTUATING MAGNETIC FIELD WHERE THE BOUNDARIES ARE SET BY A MAGNETIC INSULATOR.
AD-287 673 DIV. 9

HELICAL INSTABILITIES IN SOLID-STATE PLASMAS. SUCH INSTABILITIES ARISE WHEN A MAGNETIC FIELD IS APPLIED PARALLEL TO A CURRENT IN A SEMICONDUCTOR.
AD-287 753 DIV. 25

*MAGNETOHYDRODYNAMICS

A SURVEY IS PRESENTED OF PHENOMENA IN MAGNETO-HYDRODYNAMICS FROM THE STANDPOINT OF GEOMETRICAL HYDROMAGNETICS.
AD-287 481 DIV. 25

STUDIES OF IONOSPHERIC ABSORPTION OF RADIO WAVES BY THE COSMIC NOISE METHOD.
AD-287 858 DIV. 2

*MAGNETRONS

MINOR CONSTRUCTIONAL MODIFICATIONS IN THE PRESENT DESIGN OF POWER TUBES ARE INVESTIGATED AND FACILITIES FOR MORE RAPID RATE OF PRODUCTION WERE SET UP.
AD-287 856 DIV. 8

*MAGNETS

A PHOTOCONDUCTIVE PROBE FOR MEASURING ELECTROMAGNETIC FIELDS, IN WHICH THE LEADS BETWEEN THE PROBE AND THE DETECTOR ARE ELIMINATED.
AD-287 039 DIV. 8

*MAINTENANCE

BUILDING BLOCK STUDY. PROGRAMMED, AUTOMATIC FIELD MAINTENANCE TESTING OF ELECTRONIC SYSTEMS.
AD-287 630 DIV. 8

*MAINTENANCE PERSONNEL

PERSONNEL SUBSYSTEM ANALYSIS OF THE ATLAS MA-3 PROPULSION SYSTEM. IDENTIFICATION OF 35 HUMAN FACTORS PROBLEMS RELATED TO SAFETY, TRAINING, ORGANIZATIONAL CONTROLS, TECHNICAL DATA, PERSONNEL SELECTION AND MANNING, ENGINE HARDWARE DESIGN, GROUND EQUIPMENT, ETC.
AD-286 912 DIV. 12

*MANAGEMENT ENGINEERING
AIR FORCE SUPPLIES

THREE SETS OF CODING CRITERIA FOR DETERMINING WHICH SUPPLY ITEMS SHOULD BE RETAINED FOR AIR FORCE MAINTENANCE WERE EVALUATED. IT WAS RECOMMENDED THAT THE CRITERIA DEVELOPED BY THE AFLC LONG RANGE PLANNING GROUP AND OPERATIONS ANALYSIS DIVISION BE APPROVED FOR DOD-WIDE USE.
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*MASS SPECTROSCOPY

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*MICROWAVE OSCILLATORS

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*MOLECULAR BEAMS

AN ANALYSIS IS PRESENTED ON THE MAIN METHODS USED TO DETERMINE PHYSICAL DATA WHICH CHARACTERIZE THE HIGH SPEED MOLECULAR BEAM, AND IN PARTICULAR, THE SPEED OF MOLECULES AND THE EFFICIENCY OF THE EXCHANGE PROCESSES.
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*MOLECULAR SPECTROSCOPY

IR SPECTRA OF SELECTED KETONES, ETHERS AND ALCOHOLS BETWEEN 15 AND 35 MICRONS. SPECTRA OF KETONES IN THIS MICRON REGION ARE VERY INFORMATIVE OF THEIR DETAILED STRUCTURAL FEATURES AND DISTINGUISH BETWEEN ALIPHATIC METHYL KETONES, KETONES WITH AND WITHOUT ALPHA BRANCHING, AROMATIC METHYL KETONES AND CYCLIC KETONES.
AD-287 755 DIV. 4

*MOLECULES

AN ANALYSIS IS PRESENTED ON THE MAIN METHODS USED TO DETERMINE PHYSICAL DATA WHICH CHARACTERIZE THE HIGH SPEED MOLECULAR BEAM, AND IN PARTICULAR, THE SPEED OF MOLECULES AND THE EFFICIENCY OF THE EXCHANGE PROCESSES.
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*MOLYBDENUM ALLOYS

MOLYBDENUM ALLOY EXTRUSION DEVELOPMENT PROGRAM. FULL LENGTH T SHAPE EXTRUSIONS OF TZM WERE MADE WITH TARGET REQUIREMENTS FROM 3200-3400F BILLET HEATING WITH A REDUCTION RATIO OF ABOUT 12:1. HIGH LINER PRESSURE IN EXCESS OF 200 KSI AT AN INITIAL STEM SPEED OF 100 IN/MIN WAS REQUIRED.
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CONSTITUTIONAL DIAGRAMS FOR MO-3S, TA-TI, TA-FE, TI-ZR, U-IR, B-MO, MO-HF-RE, AND TI-B-ZR.
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*MOLYBDENUM ALLOYS
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*MOTION SICKNESS

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*MULTICHANNEL TELEPHONE SYSTEMS

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*MULTIPLEX TRANSMISSION

SOME PROBLEMS OF INFORMATION TRANSMISSION (USSR). MULTICHANNEL COMMUNICATIONS PROBLEMS: BOOLEAN FUNCTIONS AND SELF CORRECTING CODES: CONSTRUCTION OF NONBINARY ERROR-CORRECTING CODES AND THE BOUND OF THE NUMBER SIGNALS IN THEM: IDENTIFICATION OF SPATIAL OBJECTS.
AD-287 733 DIV. 5

*MUSCLE RELAXANTS

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***NAVIGATION**

ACTIVITY REPORT ON AIRPORT FACILITY INCLUDING TRAFFIC CONTROL, DISPLAY SYSTEMS, LIGHTING, COMMUNICATION, LANDING SYSTEMS.
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VISCOSITY OF SEVERAL GASES BY OSCILLATING DISK METHOD. MEASUREMENTS OF A, CO2, HE, NE AND N VISCOSITY BETWEEN 25 - 270 C AND PRESSURES OF 1 - 150 ATM. EMPIRICAL CORRELATIONS, AND CORRELATIONS BASED ON A LENNARD-JONES 6-12 AND BUCKINGHAM EXP - 6 POTENTIAL ARE PRESENTED.
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***NEUTRON BOMBARDMENT**

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***NEUTRON DETECTORS**

A FAST NEUTRON SPECTROMETER USES HE3 GAS AT PRESSURES OF 1500 PSI AND SOLID STATE DETECTORS. A DIGITAL COMPUTER PROGRAM CALCULATES AND PLOTS THE ENERGY AND ANGULAR DISTRIBUTION OF THE REACTION PRODUCTS.
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***NEUTRON SPECTROMETERS**

A FAST NEUTRON SPECTROMETER USES HE3 GAS AT PRESSURES OF 1500 PSI AND SOLID STATE DETECTORS. A DIGITAL COMPUTER PROGRAM CALCULATES AND PLOTS THE ENERGY AND ANGULAR DISTRIBUTION OF THE REACTION PRODUCTS.
AD-286 928 DIV. 8

***NEUTRONS**

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***NICKEL ALLOYS**
MECHANICAL PROPERTIES

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***NICKEL ALLOYS**
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***NIGHT SKY**
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A PORTABLE LOW-LEVEL LIGHTMETER USING AN INFRARED IMAGE CONVERTER TUBE TO CONVERT INFRARED INTO VISIBLE RADIATION WHICH REGISTERS THE BRIGHTNESS OF THE NIGHT SKY IN THE NEAR INFRARED.
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***NIOBIUM ALLOYS**

COMPOSITIONS CONTAINING V-1 W7-4 TI-60 W7-4 NB AND V-1 W7-4 MO-40 W7-4 NB COMPLEXED WITH 0,0R TO 0.1 AT-% O OR N WERE EVALUATED FOR FABRICATION FEASIBILITY HEAT TREATMENT AND MECHANICAL PROPERTIES.
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***PHOTOCHEMICAL REACTIONS**
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PHOTOCHEMISTRY OF DYES. OVER-ALL AIM OF THIS PROJECT IS TO INVESTIGATE DYE SYSTEMS WHICH COULD LEAD TO THE UTILIZATION OF SOLAR ENERGY. TOPICS INCLUDE: STEPWISE PHOTOREVERSIBLE DYE SYSTEMS, PHOTO-INDUCED QUENCHING OF FLUORESCEIN DYES, DICHROIC MOLECULES, PHOTOCHEMICAL REACTIONS.
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***PHOTOMETERS**
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NB ALLOY EXTRUSION PROGRAM. PHASE V. T40 8 IN. DIAMETER INGOTS OF NB-10W-1ZR-.1C (X-110) AND NB-5V-5MO-1ZR (B-66) ALLOYS WERE MELTED AND CONVERTED TO 4 IN. DIAMETER BILLET STOCK BY EXTRUSION. TUBE BLANK EXTRUSIONS OF 8:1 RATIO WERE MADE AT 3200-3400 F. PROCESS PARAMETER EFFECTS ARE REPORTED.
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***PLANT PIGMENTS**

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***PLASTIC PIPES**

A TRANSLATION OF SELECTED ARTICLES ON PLASTICS AND RESINS FROM THE RUSSIAN PERIODICAL SUDOSTROYENIYE (SHIPBUILDING).
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SPRAYABLE, STRIPPABLE, PROTECTIVE COATING FOR AIRCRAFT, ROCKETS, AND MISSILES. FORMULATION 2911-I-190-3 WAS RENDERED MORE STRIPPABLE FROM ACRYLIC SURFACES BY INCORPORATION OF CERTAIN PARTING AGENTS.
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***RADIATION EFFECTS**
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***RADIATION EFFECTS**
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***RADIATION EFFECTS**
SPACE ENVIRONMENTAL CONDITIONS

THE SPACE RADIATION GUIDE IS PRESENTED TO PROVIDE FACTUAL DATA CURRENTLY KNOWN AND TO POINT OUT AREAS WHERE INFORMATION IS SKETCHY AND INCONCLUSIVE. COSMIC RAYS, SOLAR RADIATION AND THE GEOMAGNETICALLY TRAPPED RADIATIONS. INSTRUMENTS FOR MEASURING THESE RADIATIONS; SHIELDING TECHNIQUES; AND BIOLOGICAL EFFECTS.
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***RADIATION HAZARDS**
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THIS STUDY EXAMINES THE EARLIEST PERMISSIBLE MISSION RE-ENTRY TIMES (THE EARLIEST TIME AFTER NUCLEAR ATTACK THAT PLANT PERSONNEL MAY RE-ENTER TO RESUME THEIR ACTIVITIES) FOR UNMANNED INDUSTRIAL COMPLEXES INCAPACITATED BY RADIOACTIVE FALLOUT. EXAMINES FIVE PETROLEUM REFINERIES FOR THE INITIAL STUDY AND METHODS FOR PREDICTING RE-ENTRY TIMES.
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*RADIOBIOLOGY SPACE FLIGHT

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*RADIOFREQUENCY ATTENUATORS

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*RADIOPROTECTIVE DRUGS METABOLISM

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*RADIOPROTECTIVE DRUGS SYNTHESIS

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*REACTION (PSYCHOLOGY)

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*REACTION KINETICS

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*RECOILLESS RIFLES BIBLIOGRAPHY

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*REFRACTION MATHEMATICAL ANALYSIS

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*REFRACTIVE INDEX MEASUREMENT

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*REFRACTOMETERS

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*REFRACTORY COATINGS

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*REFRACTORY COATINGS
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*REFRACTORY COATINGS
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*REFRACTORY MATERIALS

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*REFRACTORY MATERIALS
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*REFRACTORY MATERIALS
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*REFRACTORY MATERIALS
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*REFRACTORY MATERIALS
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*ROCKET CASES
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*ROCKET MOTORS
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*ROCKET MOTORS
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THE SPACE RADIATION GUIDE IS PRESENTED TO PROVIDE FACTUAL DATA CURRENTLY KNOWN AND TO POINT OUT AREAS WHERE INFORMATION IS SKETCHY AND INCONCLUSIVE. COSMIC RAYS, SOLAR RADIATION AND THE GEOMAGNETICALLY TRAPPED RADIATIONS. INSTRUMENTS FOR MEASURING THESE RADIATIONS, SHIELDING TECHNIQUES, AND BIOLOGICAL EFFECTS.
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*SPACE PERCEPTION

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LOW TEMPERATURE EA-2270/U-ALT-1 BATTERIES. TWENTY-FOUR MONTHS DELAYED TESTING FOR THE LICLIFP-2 LOW TEMPERATURE LECLANCHE SYSTEM. DISCHARGE TESTS WERE RUN AT 70, -20 AND -40 F AFTER 24 MONTHS STORAGE. ELECTROLYTE LEAKAGE, PREFERENTIAL ZINC CORROSION AND OTHER FACTORS AFFECTING PERFORMANCE ARE DISCUSSED.
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*SUBMARINE NOISE MEASUREMENT

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*SUBMINIATURE ELECTRICAL EQUIPMENT

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ACTIVATION MECHANISM OF CDS SINGLE CRYSTALS IRRADIATED LOCALLY BY X-RAYS. ACTIVATION BY THE DIFFUSION OF DEFECT INTO THE NONIRRADIATED PORTION AND FILLING OF THE CRYSTAL VOLUME WITH RECOMBINATION CENTERS.
AD-287 674 DIV. 25

*SULFONES

ACID CATALYZED RING CLOSURE OF O-BIPHENYLYL DISULFIDE, BETA-2-NAPHTHYLETHYL DISULFIDE, AND ALPHA-2-NAPHTHYL PROPYLDISULFIDE TO FORM DIBENZOTHIOPHENE, NAPHTHO (1,2-BETA) DIHYDRO-THIOPHENE, AND 7,8-BENZOTHIOCHROMAN.
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*SUPERCONDUCTIVITY

SUPERCONDUCTIVITY AND ITS APPLICATIONS. USSR-TRANSLATION.
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*SUPERCONDUCTORS

SUPERCONDUCTIVITY AND ITS APPLICATIONS. USSR-TRANSLATION.
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*SUPERSONIC FLOW

A TRANSLATION ON INVESTIGATING FLOW AND HEAT TRANSFER OF RAREFIED GAS IN A FLAT SUPERSONIC NOZZLE.
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THE SUPERSONIC FLOW OF AN IDEAL GAS PAST A FLAT PLATE IN THE PRESENCE OF VOLUME HEAT TRANSFER IS PRESENTED.
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*SUPERSONIC FLOW
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AD-287 425 DIV. 9

*SUPERSONIC NOZZLES

THE THEORY AND DESIGN OF A SUPERSONIC COLD PLASMA JET OF ALKALI METAL VAPOR.
AD-286 910 DIV. 25

A TRANSLATION ON INVESTIGATING FLOW AND HEAT TRANSFER OF RAREFIED GAS IN A FLAT SUPERSONIC NOZZLE.
AD-287 666 DIV. 10

*SUPPLIES
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THREE SETS OF CODING CRITERIA FOR DETERMINING WHICH SUPPLY ITEMS SHOULD BE RETAINED FOR AIR FORCE MANAGEMENT WERE EVALUATED. IT WAS RECOMMENDED THAT THE CRITERIA DEVELOPED BY THE AFLC LONG RANGE PLANNING GROUP AND OPERATIONS ANALYSIS DIVISION BE APPROVED FOR DOD-WIDE USE.
AD-287 839 DIV. 18

*SURGERY

SUMMARY OF GENERAL AND SPECIFIC TOXICITY IN MICE, RATS, AND DOGS OF PREPOLYMERS, CATALYSTS, AND POLYMERIZED POLYURETHANE MEASURED BY SEVERAL METHODS REVEAL THE RELATIVE LACK OF TOXICITY OF THESE COMPOUNDS WITHIN THE EXPERIMENTAL FRAMEWORK DESCRIBED. STUDIES OF CIN RING LABELLED POLY-URETHANE IMPLANTED INTO RAT TIBIAS INDICATED BEGINNING MOBILIZATION FROM THE SITE OF IMPLANT AT APPROXIMATELY 30 WEEKS POST IMPLANT.
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*SWITCHING CIRCUITS

STUDY AND INVESTIGATION OF AN APPLICATION OF OPTIMAL CONTROL THEORY TO A POSITIONAL SERVOMECHANISM.
AD-286 970 DIV. 7

AN ANALYSIS IS PRESENTED WHICH DESCRIBES AN ALGORITHM FOR APPLYING LINEAR PROGRAMMING TO THE PROBLEM OF DETERMINING WHETHER OR NOT A GIVEN FUNCTION IS LINEARLY SEPARABLE, AND IF SO, WHAT ARE THE WEIGHTS AND THRESHOLD VALUES REQUIRED TO FORM THE SEPARATING SYSTEM.
AD-286 978 DIV. 8

THREE-MILLIMETER WAVELENGTH DUPLEXER. GAS SWITCHING DEVICES FOR RECEIVER PROTECTION OVER THE 91-96 KMC FREQUENCY RANGE. A DUAL TR TUBE AND A CRYSTAL PROTECTOR TUBE.
AD-286 993 DIV. 8

SYNTHESIS OF CASCADE SWITCHING CIRCUITS THAT COMPUTE A GIVEN AND COMPLETELY SPECIFIED SWITCHING FUNCTION. SWITCHING CIRCUITS CONSIDERED TO BE REALIZATIONS OF ALGORITHMS. THE CASCADE ALGORITHM.
AD-287 061 DIV. 8

*SYMPOSIA
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TWELFTH ANNUAL SYMPOSIUM ON THE USAF ANTENNA RESEARCH AND DEVELOPMENT PROGRAM, 16-19 OCT 1962, HELD AT ROBERT ALLERTON PARK, UNIV. OF ILL., MONTICELLO, ILLINOIS.
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*SYMPOSIA
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AD-287 713 DIV. 14

*SYMPOSIA
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SYMPOSIA: SPACE VEHICLES AND SYSTEM DESIGN; HYPERSONICS AND RE-ENTRY; PROPULSION; STRUCTURES AND MATERIALS; MATHEMATICAL RELIABILITY TECHNIQUES.
AD-287 836 DIV. 12

SYMPOSIA EARTH SATELLITE CONTROL AND CONTROL SYSTEMS; CONTROL OF MANNED SPACE ENVIRONMENT; SIMULATION; COMMUNICATIONS.
AD-287 837 DIV. 12

*SYNTHESIS

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AD-287 875 DIV. 8

*SYNTHETIC FIBERS

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AD-287 297 DIV. 14

GLASS FIBER STRENGTH ENHANCEMENT THROUGH BUNDLE DRAWING. EXPERIMENTAL EVIDENCE OF THE STRENGTH/SIZE RELATIONSHIP IN GLASS FIBERS AND ANALYSIS PREDICTING THE INTERRELATIONSHIPS BE-TWEEN VARIABLES FOR GLASS FIBERS DRAWN FROM RODS. FEASIBILITY OF DRAWING VERY FINE GLASS FILAMENTS WITHIN BUNDLE DRAWN FIBERS.
AD-287 404 DIV. 14

*SYNTHETIC RUBBER

ELECTRICAL PROPERTIES OF SILICONE RUBBER POTTING COMPOUNDS - DIELECTRIC CONSTANT AND DISSIPATION FACTOR AT 77 F; DIELECTRIC CONSTANT AND LOSS TANGENT AT 77 AND 500 F.
AD-287 823 DIV. 14

LOAD DEFLECTION CHARACTERISTICS OF FA9 284 (LAYERED CLOTH IMPREGNATED WITH RUBBER) AT ROOM TEMPERATURE AND 0 F.
AD-287 824 DIV. 14

***TANTALUM ALLOYS**

STATE-OF-THE-ART SURVEY. CAPABILITY OF INDUSTRY TO PRODUCE REFRACTORY METAL FOIL. SPECIFIC ALLOYS OF NB, TA AND W WERE RECOMMENDED AS CANDIDATES FOR ROLLING TO FOIL.
AD-287 405 DIV. 17

ULTRA-SHORT TIME CREEP RUPTURE. THE PRIMARY OBJECTIVE OF THIS PROGRAM WAS EXPANSION AND OPTIMIZATION OF ULTRA SHORT TIME CREEP TEST EQUIPMENT FOR TESTING REFRACTORY MATERIALS. A SERIES OF TESTS WAS MADE ON SHEET SAMPLES OF TA-10W.
AD-287 528 DIV. 17

CONSTITUTIONAL DIAGRAMS FOR MO-OS; TA-IR; TA-PH; TA-ZR; W-IR; W-RH; MO-HF-RE; AND TA-W-ZR.
AD-287 548 DIV. 17

***TANTALUM CAPACITORS**

SOLID TANTALUM CAPACITOR. PROGRAM OBJECTIVES INCLUDE DESIGN AND DEVELOPMENT OF A SOLID ELECTROLYTE TA CAPACITOR CAPABLE OF OPERATION AT 100 VOLTS AT 45C; AND A 20 VOLT SOLID ELECTROLYTE TA CAPACITOR CAPABLE OF OPERATION AT 85C UTILIZING FOAMED TA AS THE CAPACITOR ANODE.
AD-287 513 DIV. 8

THIN ANODIZED TANTALUM FILM CAPACITORS WERE FABRICATED. THE GLOW DISCHARGE METHOD OF DEPOSITING THIN DIELECTRIC FILMS WAS STUDIED.
AD-287 650 DIV. 8

***TELEMETERING TRANSMITTERS**
SOLID STATE PHYSICS

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AD-287 222 DIV. 5

***TELEPHONE COMMUNICATION SYSTEMS**

DESIGN OF A PHASE MODULATOR-DEMODULATOR CAPABLE OF DIGITAL DATA TRANSMISSION OVER TYPICALLY MILITARY AUDIO COMMUNICATIONS SYSTEMS AT RATES OF 1200, 600, 300 AND 150 BITS PER SECOND.
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***TELEPHONE COMMUNICATION SYSTEMS**
MONITORS

AN/STA-13 (XE-1) TELEPHONE MONITOR SET. ENGINEERING MODEL; TWO WIRE CONNECTION TO STANDARD SWITCHBOARD USED FOR MONITORING.
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***TEMPERATURE**
MEASUREMENT

SPECTROGRAPHIC INVESTIGATION OF TEMPERATURES IN A PLASMA JET ARC TUNNEL.
AD-287 128 DIV. 25

***TERRESTRIAL MAGNETISM**

A DESCRIPTION OF THE MAGNETIC FIELD OF THE EARTH IN A SATELLITE-CENTERED COORDINATE SYSTEM.
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***TEST EQUIPMENT**

ULTRA-SHORT TIME CREEP RUPTURE. THE PRIMARY OBJECTIVE OF THIS PROGRAM WAS EXPANSION AND OPTIMIZATION OF ULTRA SHORT TIME CREEP TEST EQUIPMENT FOR TESTING REFRACTORY MATERIALS. A SERIES OF TESTS WAS MADE ON SHEET SAMPLES OF TA-10W.
AD-287 528 DIV. 17

BUILDING BLOCK STUDY. PROGRAMMED, AUTOMATIC FIELD MAINTENANCE TESTING OF ELECTRONIC SYSTEMS.
AD-287 630 DIV. 8

***TEST EQUIPMENT**
AUTOMATIC

MULTISYSTEM TEST EQUIPMENT PROGRAM. FRANKFORD ARSENAL TASKS. GFE DATA AND MATERIEL. LABORATORY AUTOMATIC CHECKOUT PROJECT. INPUT-OUTPUT BUFFER SYSTEM. TAPE-TUB DEVELOPMENT. MEASUREMENT TECHNIQUES STUDIES. FADAC TYPE A/D, D/A CONVERTER DEVELOPMENT. SYSTEM INTERFACE SPECIFICATIONS. COMPILER PROGRAM.
AD-286 976 DIV. 30

***TEST FACILITIES**

THE DESIGN OF A SHOCK AND VIBRATION EXCITER DRIVEN BY HYDRAULIC POWER IS DISCUSSED.
AD-287 846 DIV. 25

***TEST METHODS**

DETERMINATION OF MOMENTS OF INERTIA OF IRREGULAR NON-HOMOGENEOUS OBJECTS.
AD-287 934 DIV. 25

***TEST SETS**

MULTISYSTEM TEST EQUIPMENT PROGRAM. FRANKFORD ARSENAL TASKS. GFE DATA AND MATERIEL. LABORATORY AUTOMATIC CHECKOUT PROJECT. INPUT-OUTPUT BUFFER SYSTEM. TAPE-TUB DEVELOPMENT. MEASUREMENT TECHNIQUES STUDIES. FADAC TYPE A/D, D/A CONVERTER DEVELOPMENT. SYSTEM INTERFACE SPECIFICATIONS. COMPILER PROGRAM.
AD-286 976 DIV. 30

***TEXTILES**

MANUFACTURING METHODS FOR LARGE LOW-DENSITY AIRMAT STRUCTURES MADE FROM METALLIC CLOTH AND YARNS AND APPLICABLE TO SMALL VOLUME PACKAGING. MACHINE DESIGN AND SPECIFICATIONS.
AD-287 297 DIV. 14

EVALUATION OF RUBBER COATED, WIRE REINFORCED FABRIC FIRE SEALS FOR B-58 WING TUNNEL AREAS.
AD-287 820 DIV. 14

EVALUATION OF RUBBER COATED WIRE REINFORCED FABRIC FIRE SEALS FOR B-58 WING TUNNEL AREAS.
AD-287 822 DIV. 14

LOAD DEFLECTION CHARACTERISTICS OF FAR 264 (LAYERED CLOTH IMPREGNATED WITH RUBBER) AT ROOM TEMPERATURE AND 0 F.
AD-287 824 DIV. 14

***THERMAL COLUMN**

THE THERMAL CONDUCTIVITY WAS MEASURED FOR PANELS OF SILICONE RUBBER FOAM, FIBERGLAS COMPOSITES, AND AN EPOXY RESIN MICROBALLOON COMPOSITE WITH ONE FACE AT 120 F AND THE OTHER FACE AT 250, 350 AND 450 F.
AD-287 130 DIV. 14

***THERMAL CONDUCTIVITY**

THE THERMAL CONDUCTIVITY WAS MEASURED FOR PANELS OF SILICONE RUBBER FOAM, FIBERGLAS COMPOSITES, AND AN EPOXY RESIN MICROBALLOON COMPOSITE WITH ONE FACE AT 120 F AND THE OTHER FACE AT 250, 350 AND 450 F.
AD-287 130 DIV. 14

EXPERIMENTAL DATA ON THE VISCOSITY AND THERMAL CONDUCTIVITY OF LIQUID METALS (K, NA, SN-PB, BI AND HG).
AD-287 693 DIV. 25

A SUMMARY AND REVISION OF EXISTING THEORY ON CONVENTIONAL THERMOCOUPLES.
AD-287 833 DIV. 25

***THERMAL INSULATION**
GLASS TEXTILES

ANALYSIS OF FOAMGLAS INSULATION. REFRASIL B-100 BATT WAS RECOMMENDED FOR USE AS THERMAL INSULATION IN BORAL BOXES WHICH WILL BE USED IN HIGH TEMPERATURE RADIATION EFFECT STUDIES.
AD-286 986 DIV. 14

***THERMAL INSULATION**
MATERIALS

THE THERMAL CONDUCTIVITY WAS MEASURED FOR PANELS OF SILICONE RUBBER FOAM, FIBERGLAS COMPOSITES, AND AN EPOXY RESIN MICROBALLOON COMPOSITE WITH ONE FACE AT 120 F AND THE OTHER FACE AT 250, 350 AND 450 F.
AD-287 130 DIV. 14

***THERMAL RADIATION**

THE FEASIBILITY OF USING AN ISOTHERMAL TWO-PHASE SYSTEM FOR THERMAL IMAGING DETECTION.
AD-287 746 DIV. 8

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TURBULENT FLAME STUDIES IN TWO DIMENSIONAL OPEN BURNERS. EXPERIMENTAL EVIDENCE CONFIRMED THE CONCEPT THAT THE EFFECT OF TURBULENCE ON FLAMES IS ONLY TO WRINKLE AND EXTEND THE SURFACE OF THE FLAME FRONT. EXPERIMENTAL TECHNIQUES ARE DISCUSSED.
AD-287 793 DIV. 9

ANALYSIS OF PLAIN CYLINDRICAL JOURNAL BEARINGS IN TURBULENT REGIME, STEADY STATE LOAD CARRYING CAPACITY, ATTITUDE ANGLE AND FLUID FILM STIFFNESS OF THE BEARINGS WERE INVESTIGATED.
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THE SPACE RADIATION GUIDE IS PRESENTED TO PROVIDE FACTUAL DATA CURRENTLY KNOWN AND TO POINT OUT AREAS WHERE INFORMATION IS SKETCHY AND INCONCLUSIVE. COSMIC RAYS, SOLAR RADIATION AND THE GEOMAGNETICALLY TRAPPED RADIATIONS. INSTRUMENTS FOR MEASURING THESE RADIATIONS; SHIELDING TECHNIQUES; AND BIOLOGICAL EFFECTS.
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***WATER SUPPLIES**

STATUS OF KNOWLEDGE OF GROUND WATER CONTAMINANTS. INCLUDED ARE A SUMMARY, OUTLINE OF THE INVESTIGATION, LITERATURE SUMMARY, AND SUPPLEMENTAL INFORMATION ON SELECTED CONTAMINANTS. A BIBLIOGRAPHY IS INCLUDED.
AD-286 931 DIV. 13

***WATER TANKS**

LOW FREQUENCY ANECHOIC TANK FOR UNDERWATER SOUND STUDIES; HIGH DENSITY CONCRETE WALLS AND SAPER T ABSORBER MATERIAL USED.
AD-287 999 DIV. 25

***WATER VAPOR**

THE INFLUENCE OF WATER VAPOR AND ANNEALING ON THE STRENGTH OF SODA-LIME GLASS RODS; CORROSION EFFECTS; FLAW THEORY.
AD-287 445 DIV. 14

***WATER WAVES**

SURF WAVE REFRACTION. THE PROGRAMMING IN FORTRAN OF REFRACTION DIAGRAMS IS DISCUSSED.
AD-287 776 DIV. 30

***WAVE ANALYSIS**

DEVELOPS NUMERICALLY SOLVABLE UNCOUPLED WAVE EQUATIONS FOR A HOMOGENEOUS HALF-SPACE WHERE POISSON'S RATIO IS CONSTANT AND WHERE POISSON'S RATIO INCREASES.
AD-287 304 DIV. 25

ASYMPTOTIC ZONE DEVELOPMENT ON BEACHES OF NON-UNIFORM SLOPE.
AD-287 626 DIV. 13

***WAVE CHARACTERISTICS**

THE DIFFRACTION OF ACOUSTIC WAVES BY SLENDER BODIES REPRESENTING THE FLOW PLUS A DISTRIBUTION OF SOURCES ALONG THE AXIS OF THE BODY.
AD-287 282 DIV. 25

SCATTERING OF WAVES BY MULTI-COMPONENT TWO-PHASE SYSTEMS.
AD-287 988 DIV. 25

***WAVE TRANSMISSION**

NEW TECHNIQUES FOR PRECISION MEASUREMENT OF LIGHT PHOTOPLASTICITY.
AD-287 606 DIV. 25

INSTRUMENTAL SEISMOLOGY, NUMERICAL ANALYSIS AND DATA HANDLING, SOURCE MECHANISM DETERMINATION, EPICENTER DETERMINATION, WAVE PROPAGATION, DIAGNOSTIC AID FOR IDENTIFYING EARTHQUAKES AND EXPLOSIONS.
AD-287 624 DIV. 2

***WAXES**

SPRAYABLE, STRIPPABLE, PROTECTIVE COATING FOR AIRCRAFT, ROCKETS, AND MISSILES. FORMULATION 2011-I-59D-3 WAS RENDERED MORE STRIPPABLE FROM ACRYLIC SURFACES BY INCORPORATION OF CERTAIN PARTING AGENTS.
AD-287 515 DIV. 10

***WEAPONS**
RELIABILITY

A MODEL FOR CHOOSING PROTECTION LEVELS FOR EQUIPMENT CLASSES WITHIN A SET OF SUBSYSTEMS.
AD-287 437 DIV. 20

***WEATHER FORECASTING**

TABULATIONS OF DIFFUSION DATA AND METEOROLOGICAL DATA COLLECTED DURING GREEN GLOW. EXPERIMENTAL DATA ON DIFFUSION OF AN AEROSOL OVER A 16-MI RANGE.
AD-287 284 DIV. 2

STORM SUDDEN COMMENCEMENTS AND INCOMPRICUOUS UNIVERSAL TIME VARIATIONS.
AD-287 948 DIV. 2

***WEATHER FORECASTING**
AIRPORTS

TERMINAL FORECASTING FOR MCCLELLAN AFB.
AD-287 678 DIV. 2

***WEATHER FORECASTING**
WIND

AN OBJECTIVE AID FOR FORECASTING STRONG AND GUSTY SURFACE WINDS AT GEIGER AFB, WASHINGTON.
AD-286 962 DIV. 2

***WEIGHTLESSNESS**
PATHOLOGY

DISCUSSES THE BIOMEDICAL PROBLEM OF PROLONGED SPACE TRAVEL PARTICULARLY THE HAZARDS OF WEIGHTLESSNESS CAUSING HYPODYNAMIC UROLITHIASIS. A REVIEW OF THE ETIOLOGIC FACTORS IS GIVEN AND SUGGESTED PROPHYLACTIC MEASURES.
AD-287 068 DIV. 16

***WEIGHTLESSNESS**
PHYSIOLOGY

THE MOTIONS OF THE WEIGHTLESS FREE-FLOATING HUMAN ARE DISCUSSED IN TERMS OF AN OPERATOR PERFORMING MAINTENANCE AND SUPPLY FUNCTIONS BETWEEN UPON, AND WITHIN SPACE VEHICLES. A POSTURAL COORDINATE SYSTEM CONCERNED WITH ROTATING AND TRANSLATING THE SYSTEM WAS REVIEWED. THE EFFECT OF TRANSIENT WEIGHTLESSNESS ON SENSORY, PSYCHOMOTOR, AND MOTOR FUNCTIONS HAVE REVEALED MINOR EFFECTS. THE PERCEPTION OF THE POSTURAL VERTICAL AND THE RESPONSE OF THE CIRCULATORY SYSTEM TO THE RETURN OF POSITIVE GRAVITY ARE CONSIDERED AS PERTINENT PROBLEMS.
AD-287 736 DIV. 16

***WELDING**
ELECTRON BEAMS

ELECTRON-BEAM WELDING. STRENGTHS OF THE 180,000 PSI ULTIMATE STRENGTH LEVEL WERE PRODUCED BY ELECTRON BEAM WELDMENTS IN SOLUTIONIZED AND ROLLED TI ALLOY SHEET. MODULI OF ELASTICITY IN BASE METAL AND FUSION ZONES MAY BE MATCHED FOR TI ALLOYS IN ANY CONDITION OF HEAT TREATMENT OR HARDNESS PRIOR TO WELDING.
AD-287 403 DIV. 26

***WELDING**
MACHINES

ELECTRON-BEAM WELDING AND MELTING MACHINES AVAILABLE. ELECTRON-BEAM WELDING MACHINES DESCRIBED. SELECTED BIBLIOGRAPHY ON ELECTRON-BEAM PROCESSES INCLUDED.
AD-287 433 DIV. 20

***WELDS**

ELECTRON-BEAM WELDING. STRENGTHS OF THE 180,000 PSI ULTIMATE STRENGTH LEVEL WERE PRODUCED BY ELECTRON BEAM WELDMENTS IN SOLUTIONIZED AND ROLLED TI ALLOY SHEET. MODULI OF ELASTICITY IN BASE METAL AND FUSION ZONES MAY BE MATCHED FOR TI ALLOYS IN ANY CONDITION OF HEAT TREATMENT OR HARDNESS PRIOR TO WELDING.
AD-287 403 DIV. 26

***WIND**
WEATHER FORECASTING

AN OBJECTIVE AID FOR FORECASTING STRONG AND GUSTY SURFACE WINDS AT GEIGER AFB, WASHINGTON.
AD-286 962 DIV. 2

***WINGS**
GAS FLOW

AIR FLOWS AROUND WINGS LOCATED IN THE VICINITY OF THE GROUND. GROUND EFFECT ON A FINITE SPAN WING.
AD-286 971 DIV. 9

***WOOD**

BOARDS MADE FROM REPULPED NEWSPAPER AND SOME PULP WERE TESTED FOR DENSITY AND GAS DIFFUSIVITY. APPLICATION OF THE WET-PRESSING METHOD.
AD-287 446 DIV. 14

***X RAYS**

THE PERFORMANCE OF A GEIGER-MUELLER COUNTER IN THE 200 A REGION.
AD-287 552 DIV. 30

ACTIVATION MECHANISM OF CdS SINGLE CRYSTALS IRRADIATED LOCALLY BY X-RAYS. ACTIVATION BY THE DIFFUSION OF DEFECT INTO THE NONIRRADIATED PORTION AND FILLING OF THE CRYSTAL VOLUME WITH RECOMBINATION CENTERS.
AD-287 674 DIV. 25

TECHNICAL ABSTRACT BULLETIN

1. AIRCRAFT AND FLIGHT EQUIPMENT

AD-286 908 Div. 1, 12, 25
(TISTM/EJH) OTS price $6.00

Republic Aviation Corp., Farmingdale, N. Y.
THERMO-STRUCTURAL ANALYSIS MANUAL.
Final rept. on Structural Design Criteria in Task no. 13002, Structural Analysis Methods, by H. Switzky, M. J. Forray and M. Newman. Aug 62, 445p. incl. illus. tables, refs.
(Rept. no. RAC-679-1A (128-A))
(Contract AF 33(616)6066, Proj. 1367)
(WADD TR 60-517, vol. 1) Unclassified report

DESCRIPTORS: *Airframes, *Thermal stresses, Structural shells, Structures, Aircraft, Aerodynamic configurations, Cylindrical bodies, Metal plates, Bolted joints, Riveted joints, Beams, Deformation, Stresses, Elasticity, Loading, Stability, Mathematical analysis, Integrals, Tables.

A compilation of methods of solution for thermal stress problems of the types frequently encountered by aircraft designers is included. Some of the methods represent original work and others were obtained from the general literature. Where feasible, graphs and formulas are presented from which the user may obtain answers directly. These are presented in non-dimensional form to extend their applicability. In other cases, tables are furnished which describe methods of solution. Within the limitations of linear elastic theory, the following problems are treated in detail: (1) statically determinate beams; (2) redundant beams and frames; (3) riveted or bolted joints; (4) plates; and (5) axially symmetric shells. For more complex linear problems, a general method of attack is presented which reduces the thermal stress problem to an equivalent mechanical loading problem. This approach permits utilization of the great variety of analytical methods which have been developed for stress analysis of structures under purely mechanical loads. Thermal effects introduce non-linearity by causing large deflections, by affecting the mechanical properties of the material, or by introducing creep. Solutions for these problems are limited. (Author)

AD-287 030 Div. 1, 33
(TISTA/GEC) OTS price $2.25

National Aviation Facilities Experimental Center, Atlantic City, N. J.
VEHICULAR MEASUREMENTS OF EFFECTIVE RUNWAY FRICTION.
Final rept.,
by Jack J. Shrager. May 62, 65p. incl. illus. tables, 16 refs.
(Proj. no. 308-3X)
Unclassified report

DESCRIPTORS: *Runways, Friction, Vehicles, Effectiveness, Aircraft tires, Tires, Tests, Test methods, Jet planes, Climatic factors, Simulation, Airplane landings.

Tests were conducted to determine the relationship of friction measurements, as computed from full-scale jet aircraft braking tests, to measurements obtained with special ground vehicular equipment on an operational runway under simulated adverse weather conditions. Results indicated that it may be possible to employ special vehicular equipment to obtain operational runway surface friction which can be related to the maximum energy braking effectiveness for a full-scale jet aircraft. (Author)

AD-287 281 Div. 1
(TISTA/GEC) OTS price $2.25

Coleman Engineering Co., Inc., Torrance, Calif.
TRACK TESTS OF CANOPY ESCAPE CAPSULE.
Rept. for 17 June 59-2 Sep 60 on Crew Escape for Flight Vehicles,
by Thomas P. Lubinski. Aug 62, 87p. incl. illus. tables, 5 refs.
(Contract AF 33(616)3261, Proj. 1362)
(ASD TDR 62-404) Unclassified report

DESCRIPTORS: *Jettisonable cockpits, Tracks (Aerodynamics), Tests, Ejection, Recovery, Aerodynamics, Structures, Stability, Impact shock, Effectiveness, Separation, Test methods, Aerodynamic data.

The results of all of the track tests for the Air Force Canopy Escape Capsule are presented. The purposes of these tests were to evaluate the ejection and recovery of the capsule and to obtain aerodynamic, structural, component functioning, and physiological information. Descriptions of the capsule model, test equipment, and test procedure are included in the report. Feasibility of the canopy-type capsule method of escape was not fully demonstrated because the track tests were terminated prior to completing the design range of test velocities and because the test results indicated a need for an evaluation of the stability and impact problems of the capsule for these velocities. The tests showed that unguided separation of the capsule was successful, that proper functioning of the recovery system was demonstrated for the 150-kt run, and that low-level ejection capability of the escape capsule was indicated. (Author)

AD-287 477 Div. 1
(TISTA/GEC) OTS price $2.60

Naval Air Test Center, Patuxent River, Md.
EVALUATION OF A4D AIRCRAFT CATAPULT HOOKS, INDEPENDENT WIRE ROPE CORE BRIDLE AND TENSION BAR RETAINER.
Rept. no. 1 (Final),
by N. A. Vaillant and J. D. Yamnicky. 27 Sep 62, 1v. incl. illus. (Proj. RSSH 44-64; Serial no. FT2222-273)
Unclassified report

DESCRIPTORS: *Catapults, Take-off, Hooks, Launching, Jet bombers, Naval aircraft, Attack bombers, Release mechanisms, Effectiveness, Design, Separation, Flight testing.

An evaluation of modified catapult hook/bridle combinations designed to preclude premature

bridle separation during catapult operations was conducted. The extended toe catapult hook and the independent wire rope core bridle are satisfactory for service use and superior to other combinations of catapult hooks/bridles tested. Either 'fat back' catapult hooks or the original catapult hook linkages are satisfactory with the extended toe catapult hook. Incorporation of the A4D integral tension bar retainer is recommended because it is easy to hook up, difficult to misposition and satisfactorily retains the tension bar. Recommendations include changes in the Catapult Deck Gear and Accessories Service Bulletin which improve bridle/store clearance. It is also recommended that emphasis be placed on providing a standardized form of hook-up procedure including a physical inspection method, and adequate lighting in the catapult hook and holdback areas. Hardness and surface roughness of the catapult hook and bridle terminal eye must be considered in order to arrive at an optimum catapult hook/bridle combination. (Author)

AD-287 479 Div. 1
(TISTA/GEC) OTS price $4.60

North American Aviation, Inc., Columbus, Ohio.
GROUND OPERATIONAL RECOVERY TESTS OF THE LW-1 EJECTION SEAT.
June 62, 44p. incl. illus. (Rept. no. NA 60H-667)
(Contract DA 44-177-tc-659)
(TCREC TR 62-47) Unclassified report

DESCRIPTORS: *Ejection seats, Recovery, Model tests, Tests, Acceleration, Stability (Lateral), Thrust, Separation, Catapults, Parachute descents, Aviation safety, Velocity, Design, Rocket propulsion.

Two static development firings and four static demonstration firings were conducted on the LW-1 escape system. The development firings were required to define the lateral rocket thrust moment arm and to perfect the separation latch assembly. The demonstration firings proved the system's recovery capabilities under zero attitude, zero speed conditions. Analytical substantiation of recovery at velocities up to 300 knots is presented. Catapult acceleration forces are less than 12 G's with rates of onset of acceleration less than 250 G's/second. Maximum sink rate and angle of dive recovery capabilities are achieved by the immediate ballistic deployment of the personnel parachute. Design simplicity minimizes maintenance requirements. Design simplicity and redundant gas systems optimize reliability. (Author)

AD-287 550 Div. 1
(TISTA/SEB) OTS price $5.60

Air Force Inst. of Tech., Wright-Patterson Air Force Base, Ohio.
A SYSTEM FOR PREVENTING AIRCRAFT COLLISIONS.
Master's thesis,
by John Francis Welch. Aug 62, 44p. incl. illus. 20 refs. (Rept. no. GAE/EE/62-1)
Unclassified report

DESCRIPTORS: *Theses, *Aviation accidents, *Air traffic control systems, *Safety devices, Jet planes, Flight, Aviation safety, Hazards, Automatic, Detection, Monitors, Radio navigation, Aircraft, Design, Detectors, Radio communication systems, Flight instruments.

A cooperative system for preventing aircraft collisions is presented in the form of a radio in each aircraft tuned to a frequency varying with altitude, for the exchange of collision-prevention information. Warnings can be kept to a minimum without omitting valid ones by limiting the range of the radio. Three or more levels of equipment complexity are possible, with all fitting into the same system. The most complex provides the pilot with bearing to the intruder, heading of the intruder and distance to the intruder. The next lower level omits the distance measurement. These two present their information on a Collision Avoidance Indicator (CAI). The least complex set of equipment has a sector indicator, called a Pilot Warning Instrument (PWI), to show the relative position of the intruder. The CAI eliminates unnecessary turns to avoid collision, and provides information to minimize the degree of turn made. Use of the PWI results in some unnecessary turns. The primary rule is to turn right to avoid a threat from ahead, and turn left to avoid a threat from behind. The system can be used for ground control of air traffic, and for closer spacing of Instrument Flight Rules traffic. It can also be used to mark tall man-made obstructions to air traffic. (Author)

AD-287 604 Div. 1, 13
(TISTB/CCH) OTS price $15.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
SEA ICE ENGINEERING, SUMMARY REPORT - PROJECT ICE WAY.
Final rept.,
by W. D. Kingery, D. W. Klick and J. E. Dykins.
25 Sep 62, 233p. incl. illus, tables, refs.
(Technical rept. no. R 189) (Proj. Y-F015-11-014)
Unclassified report

DESCRIPTORS: *Ice, *Landing fields, Aircraft, Operation, Air force operations, Sea water.

This summary report includes a technical discussion of the site selection and engineering aspects of construction activities, together with technical evaluation of operational experience. A variety of scientific and engineering studies of sea-ice strength, mechanical properties, salinity, deformation, and deterioration characteristics were investigated along with the operational tests. Technical reports relating to (a) elastic and time-dependent deformation during aircraft operations, (b) influence of crack patterns on operational use, (c) temperature, salinity, density, and ring tensile strengths of natural and constructed sea ice, (d) stress-rupture data for sea ice, (e) in-place strength tests of sea ice, (f) long-time deformation of ice sheets, (g) elastic properties of sea ice from ultrasonic and dynamic measurements, and (h) ice deterioration are presented. Successful operational tests of aircraft of different sizes up to and including a B-52 jet bomber indicated that sea-ice platforms can carry heavier loads than has previously been recognized. Parallel investigations of properties by different techniques on the same ice has provided a basis for correlating different types of measurements and deriving necessary operational criteria from them. (Author)

AD-287 658 Div. 1, 19
(TISTE/CAM) OTS price $3.60

Electronic Systems Div., Air Force Systems Command, Bedford, Mass.
ACTIVITY REPORT.
Sep 62, 30p. incl. illus. (ESD TDR 62-27)
Unclassified report

DESCRIPTORS: *Ground controlled approach radar, *Lighting systems, *Radio communication systems, *Data processing systems, *Simulation,

*Navigation, *Display systems, Meteorology, Safety, Airplane landings, Flight testing, Indicator lights, Approach lights, Airports.

Contents:
Approach and landing systems
Airport lighting systems
Communications
Data acquisition, processing and display
Navigation
Research
Simulation
Aircraft safety
Weather

AD-287 668 Div. 1
(TISTA/SEB) OTS price $9.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
METHODS OF SELECTION AND APPROXIMATE CALCULATION OF AIR DESIGN PARAMETERS (Metody Priblizhennykh Raschetov I Vybora Parametrov Pri Proyektirovanii Samoletov).
27 Sep 62, 110p. incl. illus. tables, refs. (Trans. no. FTD-TT-62-451 from Trudy Instituta, Gosudarstvennoye Nauchno-Tekhnicheskoye Izdatel'stov Oborongiz Moskva, No. 138, 100p., 1961)
Unclassified report

DESCRIPTORS: *Jet planes, *Airframes, Aircraft, Turbojet engines, Fuselages, Wings, Trim tabs, Stiffened cylinders, Supersonic planes, Velocity, Civilian aircraft, Load distribution, Friction, Parachutes, Landing gear, Shear stresses, Mathematical analysis, Equations, Theory, Aerodynamics, Aerodynamic configurations, Design.

Specific problems in aircraft design are studied. They include airspeed determination of supersonic aircraft; selection of optimum number of turbojet engines; determination of fuselage slenderness-ratio; wing weight determination; determination of the parameters of brake assembly design; aircraft trim determinations for aircraft with tricycle landing gear; determination of the type and calculation of the rigidity of the structural stiffening system. (Author)

AD-287 690 Div. 1
(TISTA/SEB) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
SHIPS OF THE AIR OCEAN,
by L. Gil'bert. 29 Aug 62, 5p. (Trans. no. FTD-TT-62-1204 from Sovetskiy Patriot, p. 3, 15 July 62)
Unclassified report

DESCRIPTORS: *Air transportation, Jet planes, Gas turbines, Helicopters, Translations, Aircraft, USSR.

Some soviet aircraft, jet planes and jet helicopters are reviewed.

AD-287 721 Div. 1
(TISTA/SEB) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE SUPPRESSION OF SELF-OSCILLATIONS IN A SERVO-PILOT SYSTEM,
by Yu. A. Gopp. 5 Sep 62, 11p. incl. illus. 6 refs. (Trans. no. FTD-TT-62-876 from Izvestiya Vysshykh Uchebnykh Zavedeniy, Mashinostroyeniye, No. 5, pp. 26-32, 1961)
Unclassified report

DESCRIPTORS: *Automatic pilots, Oscillation, Damping, Equations, Mathematical analysis, USSR, Translations, Servo systems.

By combining the method of harmonic balance with D-decomposition operations a zone is isolated in which it is possible to develop self-oscillations. The influence of the parameters of the system and of the pulses with respect to the derivative of the deformation of these zones is shown. The possibility of suppressing self-oscillations by introducing compensating non-linearity is explained. This is carried out according to the proposal of G. S. Pospelov. The developed method of finding and suppressing self-oscillations is not limited by the order of the system and does not ignore important features of non-linear systems. In making the technical calculation, it permits us to take into consideration the sliding of the object, the imperfection of the differentiators, the inertia of the amplifiers, etc. This makes the method more broadly applicable. (Author)

AD-287 722 Div. 1
(TISTA/SEB) OTS price $4.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
PROBLEMS OF AUTOMATIC CONTROL OF MOVING OBJECTS (SELECTED ARTICLES).
28 Sep 62, 45p. incl. illus. table (Trans. no. FTD-TT-62-1073 from Voprosy Avtomaticheskogo Regulirovaniya Dvizhushchikhsya Ob''yektov, Aviatsionnyy Institut, Trudy, No. 139, pp. 71-86, 87-107, 1961)
Unclassified report

DESCRIPTORS: *Automatic pilots, *Aircraft, *Stabilization systems, Servo systems, Stability (Longitudinal), Mathematical analysis, Theory, Gust loads, Turbulence, Motion, Equations, USSR, Translations, Control systems, Oscillation, Errors.

Contents:
Self-oscillations of a neutral aircraft with an autopilot having pulse-action servomechanism
Concerning the dynamic error of automatic longitudinal stabilization of a winged aircraft in a disturbed atmosphere

AD-287 730 Div. 1
(TISTA/SEB) OTS price $3.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
SYNCHROPHASING OF PROPELLER BLADES OF MULTI-ENGINE AIRCRAFT BY AUTOMATION,
by O. B. Vlasov-Vlasuk. 22 Aug 62, 35p. incl. illus. 2 refs. (Trans. no. FTD-TT-62-1166 from Russian Book: Avtomaticheskiye Regulirovaniye Aviadvigateli, Oborongiz, Moskva, Sbornik, No. 4, pp. 3-4, 70-94, 1962)
Unclassified report

DESCRIPTORS: *Propeller blades, *Jet engine noise, *Airplane engine noise, Rotation, Noise, Vibration, Synchronizers, Automatic, USSR, Translations, Turbopropelier engines.

The analytical determination is given for the dynamic characteristics of the elements of power installations, methods of making mockups of random stationary disturbances, methods of speeding up engines, etc. The book is intended for specialists who are working with problems of automatic control of power aviation and rocket units as well as problems in the theory of automatic control. Only pages 3-4 and 70-94 of the book are translated. (Author)

AD-287 892 Div. 1
(TISTA/GEC) OTS price $10.10

National Aviation Facilities Experimental Center, Atlantic City, N. J.
RUNWAY SLUSH EFFECTS ON THE TAKEOFF OF A JET

TRANSPORT.
Final rept.,
by Daniel E. Sommers, John F. Marcy and others.
May 62, 121p. incl. illus. tables, refs.
(Proj. 308-3x)
Unclassified report

DESCRIPTORS: *Transport planes, *Jet planes, Runways, Airports, Climatic factors, Ice, Water, Mixtures, Turbojet engines, Commercial planes, Friction, Controlled atmospheres, Drag, Sprays, Nose wheels, Tests, Flight testing, Deceleration, Aviation safety, Hazards, Take-off.

In recognition of reduced takeoff and braking performance of aircraft on slush-covered runways of limited length, operational tests were conducted on a commercial jet transport aircraft under a controlled slush environment. The test program consisted of two phases related to problems associated with takeoff and problems associated with braking. This final report is on the first phase. The more significant findings on the Convair 880M were the following: The magnitude of slush drag forces was considerably greater than that predicted by earlier tests and theoretical approaches. Aquaplaning of the aircraft at high velocities caused a significant reduction in slush drag. Slush spray impingement against the aircraft and landing wheels was a significant factor in producing additional slush drag to that caused by the tires. Considering wheel size, a proportionately larger slush drag force was produced by the nosewheels than that produced by the main wheels. Considerable slippage in slush was experienced by the nosewheels and forward main wheels with little slippage on the aft main wheels. Considerable slush accumulated in recessed areas of the aircraft and presented a possible operational hazard. (Author)

2. ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-286 936 Div. 2
(TISTP/FR) OTS price $7.60

Maria Mitchell Observatory, Nantucket, Mass.
THE VARIABLE STARS IN THE SCUTUM CLOUD,
by Margaret Harwood. 1962, 79p. incl. illus. tables.
(Sponsored by the Office of Naval Research)
Unclassified report

Annalen van de Sterrewacht te Leiden, Vol. 21, issue no. 8.

DESCRIPTORS: *Variable stars, Tables.

A study was made of 65 known and of 354 newly-discovered variable stars in a region in or near the constellation Scutum. The variables were investigated on plates of the Maria Mitchell Observatory and on plates of the Harvard College Observatory and Leiden Observatory collections. (Author)

AD-286 951 Div. 2
(TISTB/CCH) OTS price $9.10

Massachusetts Inst. of Tech., Cambridge.
THE CHARACTER AND IDENTIFICATION OF EXPANSION SOILS,
by T. William Lambe. May 60, 101p. incl. illus. tables, 60 refs.
(FHA rept. no. 701) Unclassified report

DESCRIPTORS: *Soils, Identification, Instrumentation, Physical properties, Bibliography, Buildings, Analysis.

A device and method to permit the expeditious identification of foundation (for light structures) soils which would be potentially troublesome due to excessive shrinkage or swelling is described. Secondary objectives were to make a literature survey of the problem of building on expansive soils and to summarize the fundamentals of soil volume change behavior: Shrinkage and swelling behavior of inorganic soils, and Laboratory test program and swell index device. (Author)

AD-286 962 Div. 2
(TISTB/AW) OTS price $1.10

Air Weather Service, Scott Air Force Base, Ill.
AN OBJECTIVE AID FOR FORECASTING STRONG AND GUSTY SURFACE WINDS AT GEIGER AFB, WASHINGTON,
by Thomas H. Simmonds. Oct 62, 3p. incl. illus.
Unclassified report

DESCRIPTORS: *Weather forecasting, *Wind, Gusts, Air force operations, Handbooks, Airports.

Forecasting the occurrence of operationally critical values of strong surface winds with accompanying gusts presents a major problem at Geiger AFB, Washington. This investigation was conducted to develop an objective aid for forecasting such critical values. The problem concerns the forecasting of strong, southwesterly surface winds with gusts greater than 25 knots during the months of December through March. (Author)

AD-286 992 Div. 2
(TISTW/RD) OTS price $11.50

Woods Hole Oceanographic Institution, Mass.
CLOUD STRUCTURE AND DISTRIBUTIONS OVER THE TROPICAL PACIFIC. PART III,
by Joanne S. Malkus, Herbert Riehl and others.
Aug 62, 1v. incl. illus. refs. (Ref. no. 62-29)
(Contract Nonr-172100, Proj. NR 082-197)
Unclassified report

DESCRIPTORS: *Clouds, Cumulus clouds, Photographic analysis, Tropical regions, Tables, Meteorological data, Distribution, Aerial photography, Pacific Islands, Aerial photographs, Pacific Ocean.

Cloud developments and distributions photographed are analyzed and related to the 3-dimensional air flow and atmospheric structure on each flight leg. Several opportunities were presented to test the hypotheses regarding cloud patterning that were evolved in Part II. Due mainly to inadequate wind data, none of these opportunities proved ideal. Nevertheless, in compensation, a quite new type of cloud organization was discovered on this circuit. In addition, some further physical insight was provided on the formation of cumulus rows. (Author)

AD-287 052 Div. 2 25, 14
(TISTP/MS) OTS price $8.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
COLD REGIONS SCIENCE AND ENGINEERING. PART II. PHYSICAL SCIENCE. SECTION B. THE PHYSICS AND

MECHANICS OF SNOW AS A MATERIAL,
by Henri Bader and Daisuke Kuroiwa. July 62, 79p. incl. illus. tables, 22 refs. (Rept. no. 2-B)
Unclassified report

DESCRIPTORS: *Snow, *Ice, *Crystals, *Crystal structure, Materials, Stresses, Shear stresses, Failure (Mechanics), Deformation, Classification, Tables, Dielectric properties, Electrical properties, Electromagnetic waves, Absorption, Density, Precipitation, Arctic regions, Mechanical properties, Physical properties.

AD-287 106 Div. 2
(TISTP/MS) OTS price $10.50

Michigan U. Coll. of Engineering, Ann Arbor.
AGGLOMERATION OF CLOUD PARTICLES AND PROJECT HI-CUE PARTICIPATION.
Final rept.,
by A. Nelson Dingle. June 62, 126p. incl. illus. tables, 16 refs. (Rept. no. 03590-9-F)
(Contract AF 19(604)6143, Proj. 8620)
(AFCRL 62-1002) Unclassified report

DESCRIPTORS: *Clouds, *Turbulence, *Artificial precipitation, *Atmosphere models, *Vortex generators, Spectrographic data, Measurement, Meteorological data, Drops, Electronic equipment, Test methods, Data, Tables, Particles.

The several components necessary to conduct experimental observations of the coalescence of cloud droplets under the influence of an introduced vortex were developed. These components include a laboratory cloud box (vertical low-speed tunnel), a vortex-generating mechanism consisting of an airfoil and a propulsion device, and a telemicro camera capable of 5x magnification of objects 8 in. from the camera objective. Analysis of the effects of a model vortex upon a population of drops was done by means of electronic analog techniques, and these support the hypothesis that a single vortex tends to cause drops to become concentrated in a concentric band. The likelihood of collisions is thus increased. Radar studies of chaff drops in Project Hi-Cue, 1959, show that in one isolated case, a circulation did occur. Further experiments along these lines are recommended. Data collected at Flagstaff under Project Hi-Cue, 1961, are currently under analysis. The data logs for the raindrop-size spectrometer, the two-theodolite pibals, and the APQ-40 radar are included. In addition the results of basic computations on the raindrop-size and the pibals are reported. (Author)

AD-287 138 Div. 2
(TISTB/LMH) OTS price $1.60

Woods Hole Oceanographic Institution, Mass.
BIBLIOGRAPHY OF REPORTS 1961.
Jan 62, 7p. (Ref. no. 61-41)
Unclassified report

DESCRIPTORS: *Bibliography, *Marine biology, *Oceanography, Fishes, Climatic factors, Seismic waves, Geophysics, Sonar, Geography.

AD-287 139 Div. 2
(TISTB/LMH) OTS price $9.10

Woods Hole Oceanographic Institution, Mass.
BIBLIOGRAPHY OF REPORTS 1950-1960.
Jan 61, 1v. (Ref. no. 60-53)
Unclassified report

DESCRIPTORS: *Bibliography, *Marine biology, *Oceanography, Seismic waves, Geophysics, Sonar, Climatic factors, Geography, Meteorology, Ocean bottom, Underwater explosions, Gravity.

AD-287 216 Div. 2
(TISTP/FR) OTS price $2.60

American Meteorological Society, Boston, Mass.
STUDY OF THE TRANSPARENCY OF CLOUDS AND FOGS (Issledovanie prozrachnosti oblakov i tumanov),
by G. M. Zabrodskii, V. G. Morachevskii and tr. by David Kraus. June 61, 26p. incl. illus. tables (Trans. no. T-R-364 from Leningrad. Arkticheskii i Antarkticheskii Nauchno-Issledovatel'skii Institut, Trudy 228(1): pp. 68-86, 1959)
(Contract AF 19(604)6113)
Unclassified report

DESCRIPTORS: *Clouds, *Fog, Light, Transmission, Scattering, Measurement, Photometers.

AD-287 263 Div. 2, 32
(TISTB/LMH) OTS price $5.60

Aerospace Information Div., Washington, D. C.
AIRGLOW, GEGENSCHEIN, ZODIACAL LIGHT. A REVIEW OF SOVIET LITERATURE FOR THE PERIOD 1959-1962.
22 Oct 62, 49p. (AID rept. no. 62-162)
Unclassified report

DESCRIPTORS: *Scientific reports, *Bibliography, *Zodiacal light, Meteorology, Astronomical data, Atmosphere, Twilight, Clouds, Sky, Sun, Light, Electrophotography, USSR, Astronomy.

A review of Soviet investigations of airglow, gegenschein, and zodiacal light is reported for the period 1959 to 1962. All observational data obtained in the Soviet union are evaluated in the Astronomical Observatory of Leningrad University. Among the Soviet scientists most active in this field are: Krasovskiy, Fishkova, Koryagina, Fedorova, and Shefov in airglow and twilight studies; Sharonov, Grishin, and Villman, in noctilucent-cloud investigations; Pariyskiy and Gindilis in gegenschein; and Fesenkov and his school in zodiacal-light studies. (Author)

AD-287 276 Div. 2
(TISTP/FR) OTS price $11.50

American Meteorological Society, Boston, Mass.
INVESTIGATIONS OF THE IRREGULARITIES IN THE IONOSPHERE (Issledovaniia Neodnorodnostei v Ionosfere),
ed. by Iu. V. Kushnerevskii and S. F. Mirkotan, tr. by Richard M. Holden, Robert Szulkin, and Burton Hobson. Nov 61, 150p. incl. illus. tables, refs. (Trans. no. T-RC-21 from Izdatel'stov Akademii Nauk SSSR, 97pp. 1960)
(Contract AF 19(604)6113)
Unclassified report

DESCRIPTORS: *Ionosphere, Ionospheric disturbances, Motion, Statistical analysis.

Contents:
Correlation analysis as applied to media with three-dimensional characteristics
Three-dimensional characteristics of ionospheric irregularities
Movements of disturbances in the F2 layer
The anisotropy of the form of small scale irregularities and movement in the F2 layer
The movements of irregularities of different scale in the ionosphere
The drift of ionospheric irregularities
The drift of small-scale irregularities in the ionosphere
Drift measurement in the ionosphere with a simultaneous investigation of the polarization state
Application criteria of correlation analysis

AD-287 284 Div. 2, 3
(TISTP/MS) OTS price $19.75

Hanford Atomic Products Operation, Richland, Wash.
THE GREEN GLOW DIFFUSION PROGRAM. VOLUME II,
ed. by Morton L. Barad and James J. Fuquay.
Apr 62, 305p. incl. illus. tables, 72 refs.
(Geophysical research papers no. 73; Document no. HW-714, vol. 2)
(AFCRL 62-251, vol. 2) Unclassified report

DESCRIPTORS: *Meteorological data, *Diffusion, *Aerosols, *Meteorological instruments, *Weather forecasting, Instrumentation, Wind, Measurement, Washington, Dosage, Towers, Tables, Data, Tracer studies, Collecting methods.

Tabulations are presented of the diffusion data and meteorological data that were collected during GREEN GLOW, a field investigation aimed at providing experimental data on the diffusion of an aerosol over a 16-mile range. Volume I describes the field site, forecasting techniques, diffusion-measuring methods, meteorological equipment, and operating procedures. The experiments were conducted at night during the summer of 1959 on the US Atomic Energy Commission's Hanford reservation near Richland, Washington. (Author)

AD-287 419 Div. 2
(TISTA/SEB) OTS price $1.10

Aerospace Information Div., Washington, D. C.
WATER ON MARS,
by A. I. Lebedinskiy and G. I. Salova. 1 Oct 62, 2p. (AID rept. no. 62-159; Trans. from On the Quantity of Free Water on Mars. Astronomicheskiy Zhurnal, V.39:3, pp. 494-505, May-June 1962).
Unclassified report

DESCRIPTORS: *Mars, Water, Surface properties, Ice, USSR, Translations.

AD-287 421 Div. 2
(TISTP/FR) OTS price $3.60

Aerospace Corp., Los Angeles, Calif.
A DESCRIPTION OF THE MAGNETIC FIELD OF THE EARTH IN A SATELLITE CENTERED COORDINATE SYSTEM,
by L. K. Herman. 17 Sep 62, 26p. incl. illus. 3 refs. (Rept. no. TDR-169(3540-20)TN-2)
(Contract AF 04(695)169)
(SSD-TDR-62-138) Unclassified report

DESCRIPTORS: *Terrestrial magnetism, Satellite vehicles, Simulation, Analog computers.

A simple expression for the flux density of the earth's magnetic field is derived. The expression is presented in a local vertical oriented coordinate system and in an inertially oriented corrdinate system. Typical analog computer time histories of the components of the field in both coordinate systems are presented. (Author)

AD-287 427 Div. 2, 6
(TISTW/PCR) OTS price $1.60

Army Electronics Research and Development Lab., Fort Monmouth, N. J.
RADAR DETERMINATION OF THE STATISTICS OF THE LUNAR SURFACE,
by Fred B. Daniels. Aug 62, 10p. incl. illus. 7 refs. (Technical rept. no. 2304)
Unclassified report

DESCRIPTORS: *Moon, Mathematical analysis, Equations, Planets, Correlation techniques, Ultra high frequency, Very high frequency, Radar signals, Radar reflections, Statistical data, Surface properties.

The general theory of radar reflection from planetary surfaces is described. It is shown how the slope of the surface profile can be obtained from the autocorrelation function of the signal envelope. The theory is applied to lunar observations made at 440 mc, 151 mc, and 38.25 mc, and a value of 14 degrees is obtained for the rms slope. The spatial correlation function of the lunar surface is also computed from the autocorrelation function of the signal, and is found to show the existence of surface irregularities having a scale of the order of magnitude of a meter. The application of the theory to other planets is discussed and it is concluded that the measurements of the autocorrelation function of the signal should supplement those of the angular power spectrum. (Author)

AD-287 465 Div. 2, 6
(TISTP/GRW) OTS price $5.60

Massachusetts Inst. of Tech., Cambridge.
THE LINEAR PREDICTABILITY OF PRECIPITATION,
by Thomas M. Noel. Sep 62, 50p. incl. illus. table, 6 refs. (Research rept. no. 35)
(Contract AF 19(604)5220, Proj. 4641)
(AFCRL 62-1020) Unclassified report

DESCRIPTORS: *Weather forecasting, *Precipitation, *Radar echo areas, Storms, Meteorological radar, Intensity, Statistical processes, Mathematical prediction.

The problem of the short-term predictability of precipitation remained rather unamenable to investigation by dynamic methods. A diagnostic study of this problem was made using a linear prediction scheme based upon statistics of precipitation intensity. The data necessary for the determination of such statistics were obtained by the aid of a horizontally scanning radar with the signal returned by the precipitation being a measure of its intensity. It is found that (1) the linear predictability of precipitation is relatively insensitive to reasonable variations in the spatial density of the data, however, the spatial extent of the data may be a critical parameter; (2) the nonlinear behavior of precipitation elements whose sizes range from one mile up to 100 miles in order of magnitude is important for the short term predictability; (3) the space resolution with which a forecast is made will influence to some extent the level of predictability; and (4) the quality of linear prediction decreases with time as expected but not in a systematic manner because of the presence of different sizes of precipitating elements in the storms from which the data were obtained. (Author)

AD-287 584 Div. 2, 6
(TISTP/GRW) OTS price $6.60

Stanford Research Inst., Menlo Park, Calif.
COMPARISONS OF TIME INTEGRATED RADAR DETECTED PRECIPITATION WITH SATELLITE OBSERVED CLOUD PATTERNS,
by Roland E. Nagle. July 62, 56p. incl. illus. table, 23 refs. (Scientific rept. no. 1)
(Contract AF 19(628)284, Proj. 6698)
(AFCRL-62-873) Unclassified report

DESCRIPTORS: *Precipitation, *Clouds, *Radar echo area, Satellite vehicles, Television cameras, Radar signals, Aerial photographs, Air mass analysis, Plan position indicators, Effectiveness, Radar analaysis.

Results of analyses of comparisons between synoptic scale radarscope data and TIROS I television cloud pictures are presented. The objective was to ascertain if precipitating clouds can be distinguished from non-precipitating clouds in the satellite pictures. Radar echo patterns integrated over an extended period of time by a procedure that simulated moving the radar station along with the precipitation system were compared with the satellite observed cloud patterns. Nine different cases are presented, showing precipitation-to-cloud relationships in varying synoptic situations and in different climatic regions of the world. The limitations of radar as an instrument for detecting precipitation are discussed as to their effects on the basic objectives of the study. The limitations of the satellite cloud photos and the difficulties in working with these types of data are also discussed. Although some measure of success was achieved, the coarseness of the data (both radar and satellite) precludes a conclusive determination of whether or not precipating clouds evidence unique characteristics that distinguish them from non-precipitating clouds. (Author)

AD-287 603 Div. 2
(TISTP/GRW) OTS price $4.60

Space Sciences Lab., U. of Calif., Berkeley.
THE APPLICATION OF THE MAGNETOTELLURIC AND TELLURIC METHODS IN CENTRAL ALBERTA,
by S. P. Srivastava, J. L. Douglass and S. H. Ward. 14 Sep 62, 48p. incl. illus. tables, refs. (Series no. 3, Issue no. 22)
(Contracts Nonr-22289 and Nonr-311600; In cooperation with Institute of Earth Sciences, University of British Columbia, Vancouver, B. C.)
Unclassified report

DESCRIPTORS: *Earth, Electromagnetic fields, Alberta, Electrical conductance, Electrical properties, Periodic variations.

AD-287 627 Div. 2, 25
(TISTP/JW) OTS price $3.60

Brown U. Div. of Applied Mathematics, Providence, R. I.
WAVE RUN-UP ON BEACHES,
by M. C. Shen and R. E. Meyer. Oct 62, 36p. incl. illus. 11 refs. (Technical rept. no. 3)
(Contract Nonr 56234)
Unclassified report

DESCRIPTORS: *Ocean waves, *Linear systems, Motion, Gases, Dynamics, Beaches, Velocity, Acceleration, Equations.

The motion of water on a uniformly sloping beach, just after a bore reaches the shore, is studied. The shallow-water equations are used to formulate a singular hyperbolic problem, which is solved by the help of Riemann's Method and of the structural theory of quasilinear hyperbolic equations developed in gas dynamics. The shore line is found to advance suddenly with non-zero velocity and then to move up and down the beach with constant, negative acceleration. The solution is shown to contain limit lines indicating a rather unexpected, secondary bore in the back-wash. (Author)

AD-287 669 Div. 2, 12
(TISTP/JW) OTS price $2.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
OBSERVATIONS OF ARTIFICIAL EARTH SATELLITES,
by A. A. Gurshteyn. 28 Sep 62, 20p. (Trans. no. FTD-TT-62-975 from Trudy Moskovskogo Instituta Inzhenerov Geodesii, Aerofotos''yemki, i Kartografii, Moscow, Geodesizdat, pp. 103-113, 1960)
Unclassified report

DESCRIPTORS: *Satellite vehicles, *Data transmission systems, Orbital flight paths, Translations, Space probes.

AD-287 681 Div. 2
(TISTP/LMH) OTS price $3.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
PRINCIPLES OF THE THEORY OF MAGNETOTELLURIC PROFILING,
by M. N. Berdichevskiy. 21 Sep 62, 29p. incl. illus. tables, 3 refs. (Trans. no. FTD-TT-62-1062 from Prikladnaya Geofizika No. 28, pp. 70-91, 1960)
Unclassified report

DESCRIPTORS: *Terrestrial magnetism, *Earth, Periodic variations, Magnetometers, Measurement, USSR, Electric fields.

AD-287 705 Div. 2
(TISTP/JW) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
INTO THE DEPTHS OF THE UNIVERSE THE LATEST DISCCVERIES OF KAZAKHSTAN ASTROPHYSICISTS,
by M. Fel'd. 25 Sep 62, 7p. incl. illus. (Trans. no. FTD-TT-62-1255 from Kazakhstanskaya Pravda, p. 4, 27 Mar 62)
Unclassified report

DESCRIPTORS: *Lunar probes, *Astronomy, Translations Galaxies, Colors, USSR.

AD-287 710 Div. 2, 25
(TISTP/WH) OTS price $2.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
CERTAIN RESULTS OF ELECTROPHOTOMETRIC OBSERVATIONS OF THE OI, Na AND OH EMISSIONS AND THE CONTINUUM IN THE AIRGLOW,
by L. M. Fishkova and G. V. Markova. 28 Sep 62, 20p. incl. illus. tables, 18 refs. (Trans. no. FTD-TT-62-1076 from Byulleten' Abastumani Astrophysical Observatory No. 24, pp. 161-173, 1959)
Unclassified report

DESCRIPTORS: *Photoelectric cells, *Infrared radiation, *Sky brightness, USSR.

AD-287 792 Div. 2
(TISTP/FR) OTS price $1.60

Woods Hole Oceanographic Institution, Mass.
ATLANTIS CRUISE #260, 11 OCTOBER-7 NOVEMBER 1960,
by Richard M. Pratt. May 62, 9p. illus. (Ref. no. 62-19)
(Contracts Nonr-136700, Proj. NR 261-102 and Nonr-286600, Proj. NR 287-004)
Unclassified report

DESCRIPTORS: *Ocean bottom, Photographic analysis, Ocean currents, Measurement, Atlantic Ocean, Velocity.

ATLANTIS Cruise 260 made a series of velocimeter lowerings southwest of Bermuda, a bathymetric survey of the southern slope of Plantagenet Bank, and geologic investigations of Muir Seamount and Hydrographer Canyon. (Author)

AD-287 807 Div. 2
(TISTW/PCR) OTS price $4.60

Air Force Cambridge Research Labs., Bedford, Mass.
SOME SYNOPTIC FLARE DATA, 1937-1960.
Research note,
by Henry J. Smith. Aug 62, 38p. incl. illus. tables, 17 refs. (Rept. no. AFCRL 62-827)
Unclassified report

DESCRIPTORS: *Solar flares, Frequency, Sunspots, Statistical data, Statistical analysis.

Inhomogeneities and inconsistencies in the published international flare data present the need for critical editing of these data before they can be treated statistically. After suitable correction, observed monthly incidence of flares is tabulated. Hours of effective patrol must be calculated from hours of actual patrol. When these data are available, actual hemispheric flare incidence can be estimated. Flare incidence thus found is correlated moderately well with sunspot number, and with the rate of formation of new active regions. The same analysis also provides information on the relative frequency of flares of different importance. Kleczek's importance duration index is given for the months of the IGY, and compared with other flare activity indices. The apparent average durations of flares change secularly, but this undoubtedly is the result of improving methods of observation. (Author)

AD-287 847 Div. 2, 15
(TISTP/MS) OTS price $1.60

Uppsala U. (Sweden).
STANDARD ERRORS OF COSMIC RAY DATA CORRECTED FOR ATMOSPHERIC EFFECTS,
by E. Dyring and S. Lindgren. Jan 62, 14p. incl. illus. tables, 9 refs. (Technical note no. 10)
(Contract AF 61(514)1312)
(AFCRL 62-651) Unclassified report

DESCRIPTORS: *Cosmic rays, *Errors, Mathematical prediction, Mathematical analysis, Atmospherics, Data.

A formula is obtained for the standard error of cosmic ray data which have been corrected for atmospheric effects. It is used to estimate standard errors of the nucleonic and meson components corrected by different methods. The relative standard error is found to decrease with increasing counting rate up to an approximate value of 10 to the 6th power counts per time interval if simultaneous meteorological measurements are available for each recording interval. Above that counting rate the relative standard error is essentially constant. (Author)

AD-287 848 Div. 2
(TISTP/MS) OTS price $1.60

Uppsala U. (Sweden).
STORM SUDDEN COMMENCEMENTS AND INCONSPICUOUS UNIVERSAL TIME VARIATIONS,
by Arne Eld Sandstrom and Oscar L. Troncoso. 31 Mar 62, 14p. incl. illus. tables, 7 refs. (Technical note no. 11)
(Contract AF 61(514)1312)
(AFCRL 62-674) Unclassified report

DESCRIPTORS: *Atmospherics, *Diurnal variations, *Storms, *Meteorological data, *Weather forecasting, Errors.

A number of very small Forbush decreases (F.d:s) have been traced in the records from the Swedish Cosmic ray stations. Many of these F.d:s are associated with storm sudden commencements (s.s.c:s) which appear to have been regarded as doubtful as they have not been included in the monthly reports from Goettingen. A chapter is added on F.d:s associated with s.s.c:s also reported as sudden impulses by some stations. Some implications of concealed universal time variations are discussed. (Author)

AD-287 850 Div. 2
(TISTP/MS) OTS price $11.50

Washington U., Seattle.
AN OCEANOGRAPHIC SURVEY OF THE BELLINGHAM-SAMISH BAY SYSTEM. VOLUME I. PHYSICAL AND CHEMICAL DATA,
comp. by Eugene E. Collias and Clifford A. Barnes. Aug 62, 138p. incl. illus. tables, 7 refs. (Special rept. no. 32; Ref. no. M62-22)
(Contract Nonr-47710, Proj. NR 083-012)
Unclassified report

DESCRIPTORS: *Oceanographical data, Oceanographical charts, Tables, Chemical properties, Physical properties, Salinity, Temperature, Oxygen, Phosphates, Inorganic substances, Sulfites, Washington.

This volume presents a tabulation of physical and chemical observations made at various locations in the Bellingham-Samish Bay system during the period from November 1959 to November 1961. Charts show the positions of the stations sampled. Values for temperature, salinity, dissolved oxygen, dissolved inorganic phosphate and spent sulfite liquor are given at selected depths from the surface to near bottom. (Author)

AD-287 851 Div. 2
(TISTP/MS) OTS price $15.50

Washington U., Seattle.
PHYSICAL AND CHEMICAL DATA, NORTH PACIFIC OCEAN, GULF OF ALASKA AND BERING SEA - SUMMER OF 1956. A report on A Tabulation of Oceanographic Data Collected by Vessels of the U. S. Fish and Wildlife Service,
by C. M. Love. Nov 59, 1v. incl. illus. tables, 6 refs. (Special rept. no. 31; Ref. no. 59-13)
(Contract Nonr-47710, Proj. 083-012)
Unclassified report

DESCRIPTORS: *Oceanographic data, Oceanographic charts, Pacific Ocean, Tables, Chemical properties, Physical properties, Salinity, Temperature, Bering Sea, Alaska.

This report contains certain physical and chemical data obtained on 212 stations in the North Pacific Ocean, the Gulf of Alaska, and the Bering Sea during the summer of 1956 as part of the exploratory fishing program of the U. S. Fish and Wildlife Service. (Author)

AD-287 858 Div. 2, 8
(TISTP/AW) OTS price $8.60

Kiruna Geophysical Observatory (Sweden).
STUDIES OF IONOSPHERIC ABSORPTION OF RADIO WAVES BY THE COSMIC NOISE METHOD,
by Bengt Hultqvist. 15 June 62, 63p. illus. tables, refs. (Scientific rept. no. 3)
(Contract AF 61(052)601)
(AFCRL 62-1044) Unclassified report

DESCRIPTORS: *Ionosphere, *Radio waves, *Extraterrestrial radio waves, *Magnetohydrodynamics, Aurorae, Measurement, Instrumentation, Magnetic storms, Periodic variations, Twilight, Absorption.

The theory of measurements of nondeviative absorption of radio waves is reviewed. It is pointed out that the discrepancy between classical magnetoionic theory and generalized theory, in which the energy dependence of the electron collision frequency is taken into account, is appreciable in most of the lower ionosphere. It is also shown that the use of the generalized theory does not involve more work at the ordinary riometer frequencies than does the magnetoionic theory. The results of riometer measurements of quiet day absorption, sudden cosmic noise absorption, absorption associated with aurora and geomagnetic disturbances, and of polar cap absorption are reviewed. Special emphasis is placed in the last part of the paper on the problem of the variation of cosmic noise absorption in the twilight periods and the interpretation of the observations relevant to it. (Author)

AD-287 859 Div. 2
(TISTP/GRW) OTS price $5.60

Munich U. (Germany).
COMPUTATIONAL METHODS OF LONG WAVE ATMOSPHERIC RADIATION.
Technical rept.,
by Fritz Moller and Wilford Zdunkowski. Jan 62, 49p. incl. illus. tables, 10 refs.
(Contract AF 61(052)493)
(AFCRL 62-1032) Unclassified report

DESCRIPTORS: *Heat transfer, *Thermal radiation, Water vapor, Blackbody radiation, Thermionic emission, Central America, Stratosphere, Absorption.

Postulating the existence of an additional atmospheric absorber it became possible to verify partly Roenicke's radiation measurements within the upper part of a tropical airmass in which strong radiative heating was observed. Heating rates could be duplicated while calculated corresponding flux densities yield values 20% smaller than the measured net flux densities. All calculations were made on the basis of the emissivity function for water vapor which was tabulated for this purpose. (Author)

AD-287 878 Div. 2
(TISTA/SEB) OTS price $8.60

Air Weather Service, Scott Air Force Base, Ill.
TERMINAL FORECAST REFERENCE FILE. McCLELLAN AFB, CALIFORNIA. July 62, 1v. incl. illus. tables.
Unclassified report

DESCRIPTORS: *Weather forecasting, Air force operations, California, Climatic factors, Temperature, Precipitation, Airports.

AD-287 880 Div. 2
(TISTA/SEB) OTS price $8.60

Colorado School of Mines, Golden.
GEOLOGICAL AND THERMODYNAMIC ASPECTS OF LUNAR ROCKS.
Rept. for Mar 61-June 62, on Research on Materials at High Temperature,
by Peter C. Badgley, Felix C. Jaffe and others.
July 62, 86p. incl. illus. refs.
(Contract AF 29(600)2878, Proj. 6886)
(AFOSR/DRA 62-11) Unclassified report

DESCRIPTORS: *Moon, Minerals, Rock, Statistical analysis, Analysis, Thermodynamics, Heat, Temperature, Pressure, Energy, Oxides, Silicon compounds, Aluminum compounds, Magnesium compounds, Calcium compounds, Beryllium compounds, Zirconium compounds, Thorium compounds, Iron compounds, Titanium compounds, Petrology, Geology.

Geological and thermodynamic aspects of lunar rocks are studied. Several basic problems of lunar geology are examined with the main purpose of assembling the regional information needed to establish a list of possible lunar mineral deposits and to postulate on the origin of the Moon with emphasis on probable composition. Important problems related to the structural pattern of the Moon are discussed. A special study is devoted to the Vredefort Ring structure (South Africa), which has been recently interpreted as a convincing example of asteroidal impacts on the Earth. The distribution of craterlets is analyzed by statistical methods, in order to establish whether these typical lunar features are originated by volcanic activity or impact phenomena. The thermodynamic aspects are an attempt to provide a broad reconnaissance of the stability of rock-forming mineral oxides with respect to pressure and temperature. Free energy temperature diagrams were constructed to cover the behavior of various petrological oxides between 0 K and 5000 K. (Author)

3. CHEMICAL WARFARE EQUIPMENT AND MATERIALS

AD-287 134 Div. 3
(TISTB/SAT) OTS price $1.60

Army Prosthetics Research Lab., Walter Reed Army Medical Center, Washington, D. C.
DESIGN OF AN OPTICAL INSERT, TYPE 2, FOR THE TANK CBR PROTECTIVE MASK (E56R3),
by Albert B. Colman. Jan 62, 14p. incl. illus.
(Technical rept. no. 6201)
(Proj. 6X59-01-001-04)
Unclassified report

DESCRIPTORS: *Gas masks, *Optical instruments, Rubber, Military personnel, Lenses, Vision, Design.

An optical insert for the Tanker's CBR Protective Mask was developed which may be fitted to tank crew personnel who require visual correction. It is supported in the mask by insertion of its temporal struts into a series of holes in the two rubber protrusions molded to the inner side of the eyepiece channel of the mask faceblank.

AD-287 779 Div. 3
(TISTM/EJH) OTS price $7.60

Photomechanisms, Inc., New York.
DEVELOPMENT OF THE MARK II PARTICHROME PROCESSOR AND MARK III PARTICHROME SCANNER.
1962, 1v. incl. illus.
(Contracts DA 18-064-cml-2759 and DA 18-064-404-cml-387)
Unclassified report

DESCRIPTORS: *Impingers, *Biological warfare agents, *Bacterial aerosols, Design, Operation, Feasibility studies, Films, Optical equipment, Photomultipliers, Dyes, Electronic equipment, Power supplies, Incandescent lamps, Automatic, Impingers.

With the Mark II Partichrome Processor it was demonstrated that automatic stepwise collection and staining of airborne bacteria on transparent

tape is possible. The system devised is an automation of the technique of staining organisms collected on a transparent base by immersing them in various temperature controlled fluids. The Mark III Partichrome Scanner demonstrated the possibility of automatically scanning transparent tapes which have carbon particles and stained organisms with an accuracy of .1%. A secondary goal of Mark III Scanner program, which was also attained, was to reduce the scanner size and power requirement as compared to previous models. (Author)

AD-287 845 Div. 3
(TISTM/ODN) OTS price $1.10

Southern Research Inst., Birmingham, Ala.
(No title).
Monthly progress letter rept.,
by Alvin N. Bird, Jr. 7 Nov 62, 6p.
(Contract DA 18-108-AMC-32-A)
Unclassified report

DESCRIPTORS: *Chemical warfare agents, Particles, Distribution, Literature, Sampling, Detection.

This report summarizes the initial phase of a literature survey and orientation on a proposed study of chemical agents. A design study was initiated to develop techniques and instrumentation concepts for measuring concentration of chemical agents on a function of time and particle size distribution. Plans for future work are included.

4. CHEMISTRY

AD-287 195 Div. 4
(TISTM/RGR) OTS price $1.10

Cincinnati U., Ohio.
(No title).
Final rept.,
by H. H. Jaffe. 1 Oct 62, 4p.
(Contract DA 33-008-ORD-1155, Grant no. DA-ARO(D)-31-124-G59)
(AROD 1436:22) Unclassified report

DESCRIPTORS: *Bibliography, *Chemical reactions, Organic compounds.

AD-287 213 Div. 4
(TISTM/SJR) OTS price $1.10

California U., Davis.
PHOTOCHEMICALLY PRODUCED FREE-RADICALS IN SOLUTION.
Final rept., 1 July 58-31 Sep 62,
by David H. Volman. 31 Sep 62, 8p. 10 refs.
(Grant no. DA-ARO(D)-31-124-G42)
(AROD rept. no. 2094:9)
Unclassified report

DESCRIPTORS: *Photochemical reactions, *Photolysis, *Ultraviolet radiation, *Free radicals, Hydrogen compounds, Peroxides, Acetones, Acetaloehydes, Energy, Quantum mechanics, Reaction kinetics, Allyl radicals, Alcohols, Carbon compounds, Monoxides, Ethanes, Methanes, Methyl radicals, Disproportionation, Acetyl radicals, Atomic energy levels, Molecular association, Uranyl radicals, Oxalates, Solutions, Decomposition.

Allyl alcohol, water soluble and transparent at 2500 angstroms, proved to be a successful scavenger for free radicals formed in photolysis in aqueous solution. It was used in studies of hydrogen peroxide, acetone, and acetaldehyde. (Author)

AD-287 218 Div. 4, 25
(TISTM/SJR) OTS price $3.60

Aerospace Information Div., Washington, D. C.
SILICON CARBIDE ANNOTATED BIBLIOGRAPHY BASED ON SOVIET OPEN LITERATURE (PRELIMINARY).
24 Oct 62, 33p. incl. illus. tables (AID rept. no. 62-170)
Unclassified report

DESCRIPTORS: *Bibliography, *Ceramic materials, *Silicon, Cermets, Silicon compounds, Carbides, Electrical properties, Crystal structure, Physical properties, USSR, Germanium, Semiconductors.

This translation of a bibliography of open Soviet literature covers silicon and silicon carbide, with occasional references to research on other elements, chiefly germanium. Crystal structure and electrical and physical properties are among the categories encompassed.

AD-287 283 Div. 4, 25
(TISTM/RGR) OTS price $12.00

Tennessee U., Knoxville.
A REINVESTIGATION OF THE INFRARED SPECTRUM OF METHYL CHLORIDE,
by Thomas Melvin Holladay. Aug 62, 153p. incl. illus. tables, 78 refs. (Scientific rept. no. 2)
(Contract AF 19(604)7981)
(AFCRL 62-865) Unclassified report

DESCRIPTORS: *Methanes, *Chlorides, *Infrared spectroscopy, *Theses, Molecular structure, Theory, Mathematical analysis, Isotopes.

The infrared absorption spectra of CH_3Cl-35 and CH_3Cl-37 were determined and analyzed. The nu sub 2 and nu sub 3 parallel bands were resolved for both compounds. This is the first time either band has been accurately described in detail. In the nu sub 3 band, the lines from P(58) through R(60) for the CH_3Cl-35 species and P(54) through R(41) for the CH_3Cl-37 species were resolved. The values B''=0.44330 reciprocal cm and D sub J=5.99 x 10 to the -7th power reciprocal cm for CH_3Cl-35 are in excellent agreement with the reported microwave values and other infrared work. For the CH_3Cl-37 species, the value B''=0.43643 and D sub J=5.51. The nu sub 2 frequencies yield molecular constants in agreement with those obtained from the nu sub 3 band. The nu sub 5 and nu sub 6 perpendicular bands were resolved into their fine structures. Some anomalous results were noted in the 7-micron region.

AD-287 299 Div. 4
(TISTM/TCG) OTS price $1.10

Indiana U., Bloomington.
SYNTHESIS AND REACTIONS OF UNSYMMETRICAL DISULFIDES AND DISULFONES.
Suppl. to final rept., 1 Jan-30 June 62,
by E. Campaign. 10 Oct 62, 2p. (Suppl. to AD-271 991)
(Grant ORD-AA-IP-C-2192-C, Proj. 2192)
(AROD 2192:7) Unclassified report

DESCRIPTORS: *Sulfides, *Sulfones, *Thiophenes, Synthesis, Phenyl radicals, Benzoyl radicals, Napthyl radicals, Ethyl radicals, Propyl radicals, Sulfur compounds, Heterocyclic compounds, Acids, Catalysis.

The acid catalyzed ring-closure of disulfide to form thiophene or hydrox-thiophene rings was extended to include larger rings such as the thiachroman ring. It was shown that ring-closure occurs readily in o-biphenylyl disulfide to

form dibenzothiophene in beta-2-naphthylethyl disulfide to form naphtho (1,2-b) dihydrothiophene, and in alpha-2-naphthylpropyl disulfide to form 7,8-benzothiochroman. In addition, some unusual examples of cyclization of open-chain disulfides were discovered, and preliminary steps to develop conditions for inter-molecular electrophylic substitution by disulfides were made. (Author)

AD-287 401 Div. 4
(TISTM/EJH) OTS price $6.60

Institute of Polymer Research, Polytechnic Inst. of Brooklyn, N. Y.
PHOTOCHEMISTRY OF DYES.
Final rept.,
by Gerald Oster, Gisela K. Oster and others.
Apr 62, 1v. incl. illus. table, refs.
(Contract AF 19(604)8056, Proj. 6694)
(AFCRL 62-880) Unclassified report

DESCRIPTORS: *Dyes, *Fluorescent dyes, *Photochemistry, *Photochemical reactions, Polymers, Polymer solutions, Amines, Phenyl radicals, Benzenes, Methanes, Resorcinol, Halides, Colors, Fluorescence, Phthalic acids, Excitation, Ultraviolet radiation, Spectrographic analysis.

Stepwise photoreversible dye systems: In O-free solution phenosafranin bound to polymethacrylic acid is photoreduced by green light when disodium ethylenediamine tetraacetic acid is present as the electron donor for the light excited dye. The leuco species is converted by UV light to a fluorescent yellow species. Photo-induced binding of fluorescein dyes to ZnO: The phenomenon is attributed to the unique electronic configuration of the excited dye in its triplet state. Interdependence of excited states of dichroic molecules: Triphenylmethane dyes which lack trigonal symmetry of their substituent groups are colored green in solution. Apparently the absorption bands at each end of the visible spectrum are associated with the two dichroic axes. Although the free dye is photochemically inactive, the dyes when bound to high polymers in solution are capable of being photoreduced. Furthermore, the bound dye is fluorescent while the free dye is not, due to competing internal conversion processes which are suppressed on binding. Extremely long-lived intermediates in photochemical reactions of dyes in non-viscous media: Halogenated fluorescein dyes in the presence of tertiary amines are photochemically dehalogenated by visible light. In all cases an unstable yellow intermediate with a lifetime of the order of seconds is formed. (U)

AD-287 407 Div. 4, 20
(TISTM/TCG) OTS price $1.00

Quartermaster Research and Engineering Command, Natick, Mass.
IRRADIATION FACTOR-DEPENDENCY: EXPLORATORY STUDIES AND IRRADIATION-INDUCED POLYMERIZATION OF STYRENE,
ed. by F. Degering. 1962, 32p. incl. illus. tables, 9 refs.
Unclassified report

Presented at the Second International Congress of Radiation Research, 5-11 August 1962, Harrogate, England.

DESCRIPTORS: *Styrenes, *Polymerization, *Radiation effects, Chemical reactions, Polymers, Vinyl radicals, Molecular weight, Electron beams, Electron bombardment, Dose rate, Oxygen, Effectiveness, Temperature, Viscosity, Molecular structure, Infrared spectroscopy, Atmosphere, Electron accelerators.

Research was directed toward a consideration of the effect of variables on the irradiation-induced polymerization of vinyl monomers. The variables studied were dose rate, atmosphere, temperature, molecular weight, O content and moisture. (Author)

AD-287 451 Div. 4
(TISTM/ODN) OTS price $1.00

Kent State U., Ohio.
KINETIC STUDIES OF PHOTOTROPIC REACTIONS OF TRIPHENYLMETHANE LEUCONITRILES.
Final rept., Sep 60-July 62 on Aerospace Systems Personnel Protection,
by Glenn H. Brown. Aug 62, 30p. incl. illus. tables, 17 refs.
(Contract AF 33(616)7636, Proj. 6301)
(AMRL TDR 62-84) Unclassified report

DESCRIPTORS: *Triphenylmethanes, *Nitriles, Ethanols, Reaction kinetics, Colors, Ions, Cyanides, Dyes, Ultraviolet radiation, Chemical equilibrium, Solutions, Bibliography, Thermodynamics, Chemical reactions.

The mechanism of the phototropic reaction of triphenylmethane leuconitriles was studied in considerable detail. For the reaction between methyl violet and cyanide ion in C2H5OH-H2O systems the decolorization process is due to ion-pair formation. Assuming that a specific ion-pair is the reaction intermediate, a simple equation can be used to explain the interaction between the methyl violet and cyanide. Rate constants at 25.0, 35.0 and 42.3 C are given along with thermodynamic values for the reaction between methyl violet and cyanide. The leuconitrile formed by the reaction between methyl violet and cyanide is phototropic and on excitation with ultraviolet light will revert to the dye and cyanide. The role of the solvent in the phototropic process is considered. The excitation energy of the phototropic process is established. (Author)

AD-287 496 Div. 4
(TISTM/TCG) OTS price $2.60

National Engineering Sciences Co., Pasadena, Calif.
RESEARCH AND DEVELOPMENT TO SYNTHESIZE AND ISOLATE LESSER OR UNKNOWN BORANES.
Quarterly rept.,
by J. F. Ditter, H. E. Landesman, and R. E. Williams. 10 Oct 62, 17p. incl. table, 2 refs.
(Rept. no. SN-14)
(Contract AF 04(611)5156)
Unclassified report

DESCRIPTORS: *Borohydrides, *Boron compounds, *Reaction kinetics, *Decomposition, Synthesis, Chemical reactions, Pentaboranes, Mass spectroscopy, Catalysts, Mass number, Hydrides, Solids.

Kinetic data for the decomposition of nonaborane-15 at 30 C were obtained mass spectrometrically, and the rate constant for the observed first order reaction was determined. Nonaborane-15 decomposes into octaborane, which in turn is thermally unstable and decomposes further, probably into hexaborane-10, H and polyborane solids. A tentative rate constant for the decomposition reaction of octaborane, also first order, has been inferred, based on the assumption that its rate of formation equals the rate of decomposition of nonaborane (B_9H_{15} yields B_8H_{14} + (BH) solid). The decomposition reactions of tetraborane-10 and pentaborane-11 were also studied mass spectrometrically, and both were found to produce hexaborane-10 and pentaborane-9.

Attempts made to prepare dipentaboryl, B10H16, by coupling bromopentaborane over an Ullman catalyst have been negative. (Author)

AD-287 634 Div. 4
(TISTM/TCG) OTS price $1.60

Battelle Memorial Inst., Columbus, Ohio.
DEVELOPMENT OF ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF MINUTE QUANTITIES OF SELECTED ELEMENTS IN BERYLLIUM.
Interim rept. no. 2, 6 Aug-6 Oct 62,
by W. M. Henry. 25 Oct 62, 8p. incl. table, 8 refs.
(Contract NOw 62-0629-c)
Unclassified report

DESCRIPTORS: *Beryllium, *Chemical impurities, *Spectrographic analysis, Mass spectroscopy, Resistance, Neutron activation, Chemical analysis, Test methods.

Two Be materials, one of high-purity distilled metal and another of a chemical-composition grade between the high-purity and commercial-quality metal, were obtained for initial analytical studies. Plans for the evaluation of these materials by several analytical techniques are outlined and the first phase of this work has begun. (Author)

AD-287 696 Div. 4
(TISTM/ODN) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
REACTION OF HYDROGEN AND OXYGEN IN SILENT ELECTRICAL DISCHARGE VI. KINETIC ANALYSIS OF THE PROCESS USING THE EQUATIONS OF IRREVERSIBLE FIRST-ORDER PARALLEL-CONSECUTIVE REACTIONS,
by I. A. Semiokhin, N. I. Kobozev and Ye. N. Pitskhelauri. 17 Sep 62, 17p. incl. illus. tables, 3 refs. (Trans. no. FTD-TT-62-1171 from Zhurnal Fizicheskoy Khimii 36: pp. 336-344, 1962)
Unclassified report

DESCRIPTORS: *Hydrogen, *Oxygen, Reaction kinetics, Hydrogen compounds, Peroxides, Gases, Water, Glass, Aluminum, Electrical corona, Theory, USSR, Chemical reactions.

The kinetics of the processes of the reaction between O and H in glass-metal reactors conform to the scheme of first order parallel-consecutive irreversible reactions. The nondependence of the constants, calculated as functions of the specific energy, on the conditions of the experiment is established for a fairly wide range of change in the conditions of the process. The reactions of the formation and decomposition of H2O2 are electrogaseous processes which depend upon the conditions existing in the discharge. The reaction of the direct formation of H2O from H and O is a catalytic reaction which is determined by the nature of the electrode surfaces. When all-glass or glass-Al reactors (with a 100% Al content in the electrode) are used, it is possible to eliminate the parasitic process of the formation of water. (Author)

AD-287 716 Div. 4
(TISTM/TCG) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
HETEROLYTIC CONVERSIONS OF POLYFLUORINATED AZOALKANES,
by V. A. Ginsburg, A. Ya. Yakubovich and others. 5 Sep 62, 7p. incl. table, 3 refs. (Trans. no. FTD-TT-62-1070 from Doklady Akademii Nauk SSSR 142:2, pp. 354-357, 1962)
Unclassified report

DESCRIPTORS: *Polymers, *Fluorocarbons, *Azo radicals, *Methanes, *Heterocyclic compounds, Chemical reactions, Decomposition, Acids, Hydroxides, Substitution reactions, USSR, Synthesis.

A number of heterolytic conversions of polyfluorinated azoalkanes are shown for the first time. Polyfluorinated azoalkanes are extremely unstable toward oxidizing agents (halogens, H2O2, peracids, hypochlorites). Reducing agents such as HI, H2S, H3P in polar media (ether, methanol) in the cold easily react with the azo compounds studied, converting the azo group into an hydrazo group. Hexafluorohydrazomethane posesses pronounced acidic properties and is comparatively stable in solvated form (etherate and acetonate). At the same time, the CF3NH groups in hexafluorohydrazomethane can easily eliminate HF in bases. Hexafluoroazomethane was the most electrophilic of the polyfluorinated azoalkanes studied. In reactions with amines containing an NH group, mercaptans and sulfinic acids, azo compounds behave similarly to azodicarboxylic esters, but are less active. The primary products undergo further conversion due to the CF3NH group. (Author)

AD-287 720 Div. 4, 25
(TISTM/TCG) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
FOR COMPUTING THE LATENT HEAT OF VAPORIZATION OF ALKALI METALS,
by E. E. Shpil'rayn and E. I. Asinovskiy.
5 Sep 62, 10p. incl. table, 16 refs. (Trans. no. FTD-TT-62-1085 from Inzhenorno-Fizicheskiy Zhurnal, 5:4, pp. 35-40, Apr 62)
Unclassified report

DESCRIPTORS: *Alkali metals, *Lithium, *Sodium, *Potassium, *Vaporization, Thermodynamics, Specific heat, Elasticity, Atomic weight, Equations of state, Theory, Data, USSR.

The data on the elasticity of the vapor of alkali metals enable one to compute their molar heat, but not the specific heat of vaporization. The specific heats of vaporization are given for Li, Na, and K, taking into account the effect indicated. (Author)

AD-287 737 Div. 4
(TISTM/ODN) OTS price $1.10

Minnesota U. School of Chemistry, Minneapolis.
THE ACID DISSOCIATION OF MERCAPTANS.
Final technical rept., 15 June 59-15 Sep 61,
by Maurice M. Kreevoy. 15 Sep 61, 4p.
(Contract DA 49-193-md-2027)
Unclassified report

DESCRIPTORS: *Thiols, Dissociation, Spectrophotometers, Ions, Ultraviolet radiation, Protons, Hydroxides.

A large number of acid dissociation constants of mercaptans were measured by one or two of three methods: pH titration, spectrophotometric determination using the UV absorption of the mercaptide ion, and gas solubility in neutral and basic solutions. For non-conjugated mercaptans other than H2S acid dissociation constants are correlated with high precision. Conjugated mercaptans (thiophenol and thiolacetic acid) are stronger than predicted by 1.3 powers of ten. This is attributed to resonance stabilization of the anion. No Baker-Nathan or resonance effects were found. The rate of proton abstraction from 2-mercaptoethanol by hydroxide ion and other bases was measured. The reaction is diffusion controlled in the case of OH ion but slower in

the case of other bases. Proton recapture by the mercaptide is diffusion controlled if hydronium ion is the donor but not with other acids. Proton exchange is not measurably acid catalyzed. (Author)

AD-287 739 Div. 4
(TISTM/EJH) OTS price $2.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
THE KINETICS OF THE HIGH TEMPERATURE REACTION BETWEEN MAGNESIUM POWDER AND OXYGEN,
by Eli S. Freeman and Clement Campbell. Oct 62, 26p. incl. illus. 9 refs. (Technical rept. no. 3013)
(DA Proj. 599-25-001)
Unclassified report

DESCRIPTORS: *Magnesium, *Oxidation, *Reaction kinetics, Oxygen, Combustion, Powder metals, Surfaces, Adsorption, Dissociation, Chemical reactions, Theory, High temperature research.

The kinetics and mechanism of the reaction between magnesium powder and oxygen between 550 to 590 C were investigated. The rates of reaction were studied as a function of surface area, particle size, partial pressure of oxygen, and temperature. A procedure for evaluating the kinetics of reaction where the specific rate and mechanism may change during the reaction is presented. The results were interpreted in terms of 3 rate processes: (1) the adsorption of oxygen on the surface of the particle, (2) the dissociation of adsorbed oxygen, and (3) the reaction between atomic oxygen and magnesium at the oxide-metal interface. A theoretical rate equation was derived based on this mechanism. The theoretical rate expression correctly predicts many of the experimentally determined rate parameters. (Author)

AD-287 755 Div. 4, 25
(TISTM/EJH) OTS price $1.25

Monsanto Research Corp., Dayton, Ohio.
THE INFRARED SPECTRA OF SELECTED KETONES, ETHERS AND ALCOHOLS BETWEEN 15 AND 35 MICRONS.
Interim rept., Aug 61-Feb 62 on Materials Analysis and Evaluation Techniques,
by J. E. Katon. Aug 62, 36p. incl. illus. 45 refs.
(Contract AF 33(616)8465, Proj. 7360)
(ASD TDR 62-743) Unclassified report

DESCRIPTORS: *Infrared spectroscopy, *Molecular spectroscopy, *Ketones, *Ethers, *Alcohols, Molecular structure, Acetophenones, Pentanones, Hexanones, Butanones, Cyclopentanones, Benzophenones, Propyl ethers, Phenyl radicals, Alkyl radicals, Benzenes.

The spectra from 15 to 35 microns of 45 ketones, 30 ethers and 12 alcohols were analyzed and correlated. For identification purposes the data in this spectral region were shown to be useful as a supplement to data obtained in the 2-15 micron region. The spectra of ketones in the 15-35 micron region are very informative of their detailed structural features, and distinguish between aliphatic methyl ketones with and without alpha branching, aromatic methyl ketones and cyclic ketones. Tentatively, the ring size of cyclic ketones may also be determined. Study of these spectra indicates that the previous assignment of acetone is in error and a new assignment is proposed. The spectra of ethers and alcohols in the 15-35 micron region are less informative. Aliphatic ethers possess one fair group frequency, at 1/480-1/520 cm. The broad absorption by alcohols 1/650 cm was confirmed. (Author)

5. COMMUNICATIONS

AD-286 985 Div. 5, 6, 12
(TISTE/CRJ) OTS price 10.75

Philco Corp., Palo Alto, Calif.
MULTIPURPOSE RECEIVER DESIGN STUDY.
Final rept.
28 Sep 62, 333p. incl. illus. tables (Rept. no. WDL-TR1850)
(Contract AF 04(695)113)
Unclassified report

DESCRIPTORS: *Satellite vehicles, *Radio receivers, *Ground support equipment, *Data transmission systems, Reliability, Doppler tracking, Modulation, Intermediate frequency amplifiers, Frequency multipliers, Radio-frequency oscillators, Power supplies, Maintenance, Radio interference, Operation, Very high frequency, Ultra high frequency, Superhigh frequency, Remote control systems, Feedback, Tracking.

The multipurpose receiver is designed to meet functions required of tracking stations for the majority of anticipated space programs through 1970. A detailed design study is presented as a guide for final development of a multipurpose receiver to function in the frequency bands of 100 mc to 10 gc. Discussions include the use of standard detection methods plus phase and frequency feedback techniques for detection of received signals including wide-band FM, narrow-band FM, PM, AM, and multiple angle modulations. Reliability and maintainability evaluations are also included. (Author)

AD-287 222 Div. 5
(TISTW/RD) OTS price $3.00

Sylvania Electric Products, Inc., Buffalo, N. Y.
TELEMETRY SOLID-STATE MICROWAVE TRANSMITTER T( )/AKT.
Final rept., May 60-Jan 62,
by John Bartnik. Aug 62, 144p. incl. illus. 31 refs. (Rept. no. A79-9-5.0-27)
(Contract AF 33(616)7433, Proj. 4107)
(ASD TDR 62-307) Unclassified report

DESCRIPTORS: *Telemetering transmitters, *Microwave communication systems, Microwave equipment, Communication equipment, Transistors, Sidebands, Frequency multipliers, Variable capacitors, Microwave oscillators, Solid state physics.

The feasibility of the solid-state approach toward the development of telemetry transmitters within the microwave region was established. Two solid-state transmitters, a single sideband suppressed carrier (SSSC) transmitter and a frequency modulation (FM) transmitter, which were constructed to illustrate the solid-state approach at high frequencies, are described. Two transmitters were developed during the development phases: (1) an SSSC transmitter with a minimum single sideband RF output power level of 25 milliwatts and an RF carrier of 0.6 watts at 2250 mc, and (2) an FM transmitter with a minimum RF output power level of 2.0 watts at 2250 mc. The techniques investigated during the development of these transmitters constitute a significant step toward operational ultra-reliable transmitter equipment. (Author)

AD-287 453 Div. 5, 15
(TISTP/TL) OTS price $1.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
UPPER BOUND TO THE CAPACITY OF A LINEAR TIME-

VARYING CHANNEL WITH ADDITIVE GAUSSIAN NOISE,
by G. David Forney, Jr. 26 Sep 62, 15p. incl. illus. 10 refs. (Rept. no. 34G-10)
(Contract AF 19(628)500)
(AFESD TDR 62-144) Unclassified report

DESCRIPTORS: *Communications systems, *Numerical analysis, *Matrix algebra, *Probability, *Statistical distribution, Noise, Sequences, Transformations (Mathematics), Inequalities, Determinants, Errors.

The analysis is concerned with the evaluation of the upper bound to the capacity of a linear time-varying channel obtained by finding the capacity of the same channel when its behavior at all times is known a priori. Numerical evaluation turns out to depend on the distribution of the eigenvalues of a random infinite-dimensional matrix, which is apparently an unsolved mathematical problem. Evaluation is possible in two special cases: first, where the channel is not time-varying in which case the capacity formula reduces to that formerly known; second, when the channel has no memory, that is $y = ax + u$, where a is random and n is white and gaussian. (Author)

AD-287 485 Div. 5, 8
(TISTE/CAM) OTS price $9.10

National Cash Register Co., Dayton, Ohio.
HIGH FREQUENCY DIGITAL COMMUNICATION SYSTEM.
Quarterly progress engineering rept. no. 5, 1 June-31 Aug 62.
15 Oct 62, 101p. incl. illus. (NCR rept. no. 3-5Q)
(Contract AF 33(600)42197)
Unclassified report

DESCRIPTORS: *Digital systems, *Data transmission systems, *Communication systems, High frequency, Multipath transmission, Pulse generators, Pulse modulation, Detectors, Coding, Computer logic, Electronic circuits, Timing circuits, Intermediate frequency amplifiers, Band pass filters, Power supplies, Integrators, Full wave rectifiers, Electronic equipment, Airborne, Transistors.

Effort concerns the development of special modulation, demodulation, digital coding, and control equipment for a high-frequency digital communication system that provides highly reliable operation in the presence of multipath propagation and doppler shift. Technical information describes and explains the operation of the circuits used in the control and coding equipment. Schematic diagrams of these circuits are included, and a reference index is provided. (Author)

AD-287 559 Div. 5
(TISTW/RD) OTS price $9.10

National Scientific Labs., Inc., Washington, D. C.
MONITOR SET, TELEPHONE AN/GTA-13(XE-1) ENGINEERING TEST MODEL.
Interim rept., 1 July 61-15 June 62,
by Francis E. Stimson. 15 June 62, 1v. incl. illus. tables.
(Contract DA 36-039-sc-88911, Proj. no. 3B21-09-001)
Unclassified report

DESCRIPTORS: *Telephone communication systems, *Voice communication systems, *Monitors, Transistors, Audiofrequency, Model tests, Reliability, Recording systems, Panel boards (Electricity).

The two engineering test models of the telephone monitor set, AN/GTA-13 (XE-1) that have been designed and constructed monitor any voice frequency land line by means of a two wire connection to a standard switchboard. As many as 15 lines may be monitored simultaneously. Provision is made for automatic tape recorder control, and a 7 digit dialed number can be recorded and displayed. Electrical circuits are transistorized. A battery or dc power source may be used. A reliability study made on the tentative breadboard design resulted in a predicted reliability which more than meets specifications. Details of basic system requirements, the reliability study, circuit design and development, and mechanical design features are described and discussed in the following report. Typical electrical performance data also are included. (Author)

AD-287 640 Div. 5, 12
(TISTW/RD) OTS price $13.50

Institute of Science and Tech., U. of Michigan, Ann Arbor.
INVESTIGATION OF OPTICAL SPECTRAL REGIONS FOR SPACE COMMUNICATIONS.
Interim rept. no. 2, 1 May-31 July 62,
by Russell A. Rollin, Jr. Nov 62, 188p. incl. illus. tables, 65 refs. (Rept. no. 4968-2-P)
(Contract AF 33(657)7962) Unclassified report

DESCRIPTORS: *Light communication systems, Signal to noise ratio, Modulators, Optical systems, Lasers, Lenses, Sources, Blackbody radiation, Stars, Planets, Sun, Interference, Infrared detectors, Infrared photoconductors, Space flight.

An analysis is presented of space-communications systems in the optical spectrum (wavelengths of 0.2 to 100 microns). Background interference expected during various space missions was also investigated, and a literature search on transmitter and receiver components was carried out. The systems studies included derivation of the general optical systems range equation and equations for the maximum theoretical range of optical communications and the maximum theoretical channel capacity. The general range-bandwidth equation was extended into two special range equations (one for photocathode-type and one for photoconductive-type quantum detectors). The background-interference work included studies of irradiance vs. wavelength of some of the planets and brighter stars. The equation of the probability of seeing a star of a given magnitude or greater was derived. Also studied was the literature on optical-transmitter modulators and modulation techniques and on optical-system lenses and reflector-aperture characteristics. Analysis and configurations for beaming an extended source are described. The blackbody temperature of a reflector in the space environment at its maximum temperature was investigated. (Author)

AD-287 733 Div. 5, 30
(TISTB/CCH) OTS price $5.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ACADEMY OF SCIENCES OF THE USSR. LABORATORY OF INFORMATION TRANSMISSION SYSTEMS. PROBLEMS OF INFORMATION TRANSMISSION (SELECTED ARTICLES).
12 Oct 62, 57p. incl. illus. 34 refs. (Trans. no. FTD-TT-62-888 from Akademiya Nauk SSSR. Laboratoriya Sistem Peredachi Informatsii. Problemy Peredachi Informatsii, No. 10, pp. 5-23, 35-41, 42-48, 49-56, 1961)
Unclassified report

DESCRIPTORS: *Multichannel telephone systems, *Multiplex transmission, Coding, Mathematical

analysis, USSR, Theory, Errors, Reading machines, Operators (Mathematics), Algebras, Special functions, Geometry.

Contents:
Some problems of multichannel communications
The geometry of Boolean functions and self-correcting codes from the point of view of the Erlangen Program
The construction of nonbinary error-correcting codes and the bound of the number of signals in them
Identification of spatial objects

AD-287 785 Div. 5
(TISTP/WH) OTS price $2.60

Rome Air Development Center, Griffiss Air Force Base, N. Y.
THE DESIGN AND DEVELOPMENT OF THE R-1084 SINGLE-SIDEBAND RADIO RECEIVER,
by Paul D. Simpson. Sep 62, 24p. incl. illus. 6 refs. (Rept. no. RADC TDR 62-389)
(Proj. no. 4562)
Unclassified report

DESCRIPTORS: *Radio receivers, *Radio communication systems, *Sidebands, Design, High frequency.

Radio receiver R-1084 is a single-sideband equipment developed by the US Air Force, adaptable to many different applications. This report reviews some of the design details and outlines a few of the final acceptance tests. (Author)

AD-287 876 Div. 5, 12
(TISTP/MS) OTS price $1.10

Airborne Instruments Lab., Inc., Mineola, N. Y.
THE INSTRUMENTATION OF AN ARRAY OF REFLECTORS FOR PASSIVE SATELLITE COMMUNICATIONS,
by A. E. Ruvin and S. W. Gery. 1962, 9p. incl. illus. 5 refs.
Unclassified report

DESCRIPTORS: *Communication systems, *Communication equipment, *Reflectors, *Satellite vehicle antennas, *Signals, Signal-to-noise ratio, Test equipment, Tracking, Automatic, Antenna hardware, Oscillators, Satellites, Instrumentation, Processing.

An experiment to prove the feasibility of arrays in satellite communications is now under way at Ohio State University. Four 30-foot reflectors have been instrumented for the University to make adaptively coherent the signals received by each dish from an Echo satellite. The satellite is illuminated by a remote transmitted signal. The effective gain of a 60-foot dish is obtained by the effects of slow irregularities in propagation and phase shifts, which are automatically compensated for in the signal-processing equipment. Acquisition, angle tracking, and several modes of cohering the parametric RF amplified signals are incorporated in this setup. (Author)

AD-287 887 Div. 5, 30
(TISTP/FR) OTS price $7.60

Litton Systems, Inc., Waltham, Mass.
INVESTIGATION OF AUTOMATION OF SPEECH PROCESSING FOR VOICE COMMUNICATION,
by George S. Sebestyen and David Van Meter. 28 May 62, 70p. incl. illus. tables, 6 refs.
(Scientific rept. no. 1)
(Contract AF 19(604)8828, Proj. 4610)
(AFCRL 62-390)
Unclassified report

DESCRIPTORS: *Speech transmission, Speech, Analysis, Synthesis, Data processing systems, Digital systems, Voice communication systems.

The AFCRL Speech Analyzer consists of an 18-channel vocoder and a multiplex which quantizes the amplitudes of each of the 18 bands of frequencies into 3 bits. This results in a 54 bit description of the instantaneous speech spectrum. In addition, the voice amplitude is quantized into 3 bits and the pitch frequency into 6 bits. An additional bit is reserved for indicating whether the sound is voiced or unvoiced. A 64 bit computer word thus describes the speech sound at an instant of time and 50 such samples are taken each second. Amplitude normalization is achieved by quantizing ratios with respect to the sum of the individual channel amplitudes, or area under the pattern. (Author)

6. DETECTION

AD-287 211 Div. 6, 18
(TISTA/VGW) OTS price $2.60

Electro-Optical Systems, Inc., Passadena, Calif.
COHERENT OPTICAL SURVEILLANCE DEVICES,
by Richard E. Bradbury. 30 Aug 62, 22p. incl. illus. (EOS rept. no. 2230-Q-2)
(Contract AF 30(602)2710, Proj. 4506)
(RADC TDR 62-420)
Unclassified report

DESCRIPTORS: *Aerial reconnaissance, *Optical systems, *Phase shifters, *Lasers, *Infrared detectors, Power dividers, Interferometers, Design, Mathematical analysis, Helium, Neon, Photomultipliers, Phase detectors.

A gas cell phase shifter was assembled and is undergoing preliminary tests. For the purpose of calibrating the phase shifter, a photomultiplier fringe detection system was adapted to a Twyman-Green interferometer. Initial work has begun on the differential phase shift interferometer. (Author)

AD-287 229 Div. 6
(TISTW/PCR) OTS price $1.10

New Mexico U. Engineering Experiment Station, Albuquerque.
HORIZONTAL ANGULAR ERROR STATISTICS: PRELIMINARY REPORT,
by Donald C. Thorn, Ralph J. Rainey, Jr. and Wallis R. Cramond. Feb 61, 6p. incl. illus.
(Technical rept. no. EE-41)
(Contract DA 29-040-ORD-1238)
Unclassified report

DESCRIPTORS: *Radar, Tests, Refraction, C band, Meteorological data, Terrain, Statistical analysis, Atmospheric refraction, Azimuth, Errors.

The correction of radar elevation angle errors due to atmospheric refraction is studied. The techniques used in this and most similar studies assume that the atmosphere is distributed such that index of refraction varies with altitude only. To test this assumption and to investigate the errors in horizontal or azimuth angle, the variation of azimuth angle readings taken by a radar on a fixed beacon was considered. A preliminary report on these experiments is presented. (Author)

Division 6 - DETECTION

AD-287 231 Div. 6
(TISTW/PCR) OTS price $5.60

New Mexico U. Engineering Experiment Station, Albuquerque.
RADAR ELEVATION ANGLE ERRORS AND REFRACTION CORRECTIONS,
by Wallis R. Cramond, James E. Leeman and Donald C. Thorn. Sep 62, 46p. incl. illus. tables, 11 refs. (Technical rept. no. EE-79)
(Contract DA 29-040-ORD-1238)
Unclassified report

DESCRIPTORS: *Radar, Refraction, Diurnal variations, Time, Meteorological data, Geometry, Mathematical analysis, Atmospheric refraction, Errors.

The results of the analysis of 474 radar elevation angle measurements are presented. The Fannin-Jehn, Rainey-Thorn, and Bean-Cahoon refraction correction methods are compared. Computed refraction corrections were obtained based in most cases on refractivity profiles determined from rawinsonde observations. Errors in the refraction correction from various sources are discussed as is the variation of total refraction with time of day and season. It is concluded that more reliable and time coordinated meteorological data as well as more accurate radar observed angles are needed to study and justify any detailed refraction correction method such as the Fannin-Jehn and the Rainey-Thorn methods. (Author)

AD-287 286 Div. 6, 12, 2, 25
(TISTW/PCR) OTS price $2.60

Aerospace Information Div., Washington, D. C.
TRACKING OF MISSILES AND SPACE VEHICLES. REVIEW OF SOVIET LITERATURE.
Quarterly rept. no. 2, May-July 62
15 Oct 62, 26p. incl. illus. table, 17 refs.
(AID rept. no. 62-156; 2 (18))
Unclassified report

DESCRIPTORS: *Guided missiles, *Satellite vehicles, *Ionospheric disturbances, *Clouds, *Radio astronomy, USSR, Plasma physics, Radioactivity, Ultraviolet radiation, Solar energy, X rays, Tracking, Ions, Bibliography.

The second in a quarterly report series reviewing Soviet developments in tracking missiles and space vehicles is presented, which is based on source materials received at the Aerospace Information Division from May 1962 through July 1962. Information not directly related to the assigned subject has been included because of its broad implications for study in this field. The materials in this report deal with ion clouds and ionosphere perturbations and radio astronomy. (Author)

AD-287 413 Div. 6, 30
(TISTW/RD) OTS price $2.60

White Sands Missile Range, N. Mex.
AN/FPS-16 RADAR DATA CALIBRATION TECHNIQUES AT WHITE SANDS MISSILE RANGE,
by L. J. McManus and R. E. Green. Oct 62, 22p. incl. illus. (Technical rept. no. SELWS-E-102)
Unclassified report

DESCRIPTORS: *Data, *Search radar, *Calibration, Radar tracking, Test methods, Errors, Test facilities, Data processing systems, Errors.

A presentation of the complete data calibration techniques fro AN/FPS-16 Radars used at White Sands Missile Range, New Mexico. Certain pertinent local constants are given as well as computation techniques. (Author)

AD-287 422 Div. 6
(TISTW/RD) OTS price $1.10

Bendix Systems Div., Bendix Corp., Ann Arbor, Mich.
RADAR PULSE MODULATION BY EXTENDED ELECTRON CLOUDS,
by A. Kresse. 18 July 62, 7p. incl. illus.
(Rept. no. FS-62TN-1033; BSC-33010)
(Contract AF 04(694)211) Unclassified report

DESCRIPTORS: *Pulse modulation, *Radar pulses, Mathematical analysis, Electrons, Clouds, Radar, Modulation.

AD-287 440 Div. 6
(TISTW/RD) OTS price $1.60

Hallicrafters Co., Chicago, Ill.
JAMMER EVALUATOR QRC-184(T).
Monthly progress rept. no. 4, 25 Sep-25 Oct 62, 29 Oct 62, 9p. incl. illus. (Rept. no. HLC 094-903365)
(Contract AF 33(657)9312)
Unclassified report

DESCRIPTORS: *Radar jamming, Radar transmitters, Radiofrequency filters, Temperature control.

AD-287 484 Div. 6, 2
(TISTW/PCR) OTS price $8.60

New Mexico U., Engineering Experiment Station, Albuquerque.
A RADAR REFRACTION CORRECTION FOR SYMMETRIC AND NONSYMMETRIC TROPOSPHERIC INDEX DISTRIBUTIONS,
by Ralph J. Rainey and Donald C. Thorn. Feb 61, 90p. incl. illus. tables, 13 refs. (Technical rept. no. EE-43)
(Contract DA 29-040-ORD-1238)
Unclassified report

DESCRIPTORS: *Radar, *Refraction, Radar tracking, Mathematical analysis, Equations, Differential equations, Refractive index, Theory, Atmosphere, Atmospheric refraction.

The purpose of this study is to approach the mathematics of the refraction problem from the basic differential equation of the ray path in a variable-velocity type of medium. The true refraction mechanism, the gradient of the refractive index along the ray path irrespective of the symmetric properties of the medium is emphasized. In order to emphasize the source of ray theory, the radar refraction problem is initiated from an assumed field solution of Maxwell's equations. A discussion of methods applicable to an atmosphere characterized by spherical symmetry is given. The concept is applied to the spherically symmetric atmosphere to facilitate a detailed examination of the approximations made in the development of the method as well as to indicate the applicability of the concept to this widely used model. Initial investigation indicates excellent results are obtained at launch angles of 1 degree or less when true range is assumed known and the target position error due to bending is desired in the spherically symmetric atmosphere characterized by regions of constant dn/dR. (Author)

AD-287 517 Div. 6, 25
(TISTW/RD) OTS price $11.00

Syracuse U., N. Y.
RESEARCH CONCERNING INFRARED EMISSIVITY (I) ATMOSPHERIC OPTICAL NOISE MEASUREMENTS (II).
Final rept.,
by Roy Paulson, Eric Ellis and Nathan Ginsburg.

15 Aug 62, 131p. incl. illus. refs.
(Contract AF 19(604)3908)
(AFCRL 62-869) Unclassified report

DESCRIPTORS: *Infrared radiation, *Thermal targets, Atmospheric refraction, Atmospherics, Interference, Radiometers, Optics, Surface targets, Blackbody radiation, Infrared spectroscopy, Infrared detectors, Terrain, Identification.

In an effort to determine the limits of detectibility and discrimination of ground objects, investigations were conducted concerning the effective emissivities of various terrain objects. Since these were very nearly the same, examples were sought wherein discrimination disappeared. It was found that such effects occurred. They were termed washout. This occurred most often at sunrise and sunset. The second limiting factor on discrimination appeared to be variations in emission that were not associated with the source. These were termed atmospheric optical noise. Many previous investigators had observed this phenomenon, which was called scintillation, twinkle, and various other names. This investigation was concerned primarily with the infrared and was the first to report such measurements beyond 1 micron wavelength. The atmospheric optical noise was dependent on the weather, being greatest on sunny days and least on over-cast nights. It is shown to be independent of wavelength. It does depend on height above the surface, on frequency and on area of the receiver. An explanation of the phenomena is given in terms of a theory by Tatarski. This is based on inhomogeneities in the index of refraction of the air due to turbulence. (Author)

AD-287 558 Div. 6, 12
(TISTW/RD) OTS price $1.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
DIVISION 7. ENGINEERING.
Quarterly progress rept., 1 July-30 Sep 62.
15 Oct 62, 12p. (Group no. 71)
(Contract AF 19(628)500)
(AFESD TDR 62-145) Unclassified report

DESCRIPTORS: *Guided missile research, *Satellite vehicle research, *Radar equipment, Moon, Tracking, X band, Release mechanisms, Antennas, Satellite vehicles, Re-entry aerodynamics, Tracking telescopes, Re-entry vehicles, Sun, Diplole antennas.

Contents:
Special high-pressure apparatus for materials research
8-mm Lunar tracker
Haystack antenna system
L-band conversion of the Millstone Hill Radar system
UHF L-band dipole dispenser
X-band dipole dispenser, Mark II
X-band dipole dispenser, Mark III
X-band dipole winding machine
X-band tracking feed, model II
Analog orbit computer
Satellite-tracking antenna
Re-entry physics
S-band monopulse feed
48-inch spectrometric telescope
Trailblazer II, optical experiment
Ground-based optical calibration equipment
Multi-element total event spectrometers (METES)
Instrument mounts and KC-135 general arrangement
Ballistic missile re-entry systems (BMRS)
Electrostatic vidicon television camera
Optical radar
Solar radar
Lunar radar program
Ballistic missile re-entry systems program

AD-287 562 Div. 6
(TISTW/PCR) OTS price $1.60

Mitre Corp., Bedford, Mass.
PARAMETER ESTIMATION THEORY AND SOME APPLICATIONS OF THE THEORY TO RADAR MEASUREMENTS,
by R. Manasse. 1 Apr 60, 13p. 8 refs. (Technical series rept. no. 3)
(Contract AF 33(600)39852)
(ESD TDR 62-50) Unclassified report

DESCRIPTORS: *Radar, Probability, Noise (Radar), Polynomials, Velocity, Mathematical analysis, Equations, Information theory, Theory, Measurement.

The general theory of parameter estimation is developed using the inverse probability approach. Where the measurements are perturbed by additive Gaussian noise and when the received information is sufficient to determine the parameters of interest rather accurately, it is shown that an optimum method of processing redundant data based on the maximum likelihood approach reduces approximately to the solution of k nonlinear equations in the k unknown parameters. An expression is derived for the resulting error moment matrix of the parameters. It is shown that this same moment matrix for a minimum variance estimate is obtained by using results derived by Cramer. The theory is illustrated by applying it to several radar measurement problems of interest. (Author)

AD-287 563 Div. 6
(TISTW/PCR) OTS price $1.60

Mitre Corp., Bedford, Mass.
SUMMARY OF MAXIMUM THEORETICAL ACCURACY OF RADAR MEASUREMENTS,
by R. Manasse. 1 Apr 60, 9p. 7 refs. (Technical series rept. no. 2)
(Contract AF 33(600)39852)
(ESD TDR 62-151) Unclassified report

DESCRIPTORS: *Radar, Errors, Noise (Radar), Range, Velocity, Mathematical analysis, Equations, Information theory, Measurement.

Some general formulas are summarized for maximum theoretical accuracy of radar measurements on a target in the presence of additive white Gaussian noise. The formulas are specialized to some particular cases of interest. (Author)

AD-287 616 Div. 6, 8, 12
(TISTP/JW) OTS price $1.10

Battelle Institut, Frankfurt/Main (Germany).
INSTALLATION AT FRANKFURT OF A RECEIVING STATION FOR THE TRANSIT PROGRAM, PHASE I.
Final rept. on Phase 1,
by J. Eitzenberger, J. Hillmann and others.
31 Aug 60, 4p. illus. tables.
(Contract DA 91-591-EUC-1435)
Unclassified report

DESCRIPTORS: *Satellite vehicles, *Doppler tracking, *Doppler navigation, *Radio stations, Navigation, Tracking, Very high frequency, Dipole antennas, Radio equipment.

The receiving station allows a simultaneous reception of 2 frequencies of a satellite providing useful tracking data or useful ionospheric refraction data. The 2 receivers cover the range between 53 and 262 mc that includes satellite frequencies of 54, 108, 162 and 216 mc, except 324 mc. It will be possible to extend this frequency range up to 475 mc after purchasing converters and low noise preamplifiers. By means of the fixed frequency receiver E 390

envisaged for the reception of standard frequencies and time signals, satellites can be observed at a frequency of 20 mc (using a separate local oscillator). The establishment of the Transit Station is performed mainly according to Weiffenbach (Measurement of the Doppler Shift of Radio Transmissions from Satellites, Proc. IRE 48 (1960), p. 750). (Author)

AD-287 731 Div. 6
(TISTW/RD) OTS price $14.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
DESIGNING RADAR TRACKING SYSTEMS WITH RANDOM DISTURBANCES TAKEN INTO ACCOUNT (Raschet Radiolokatsionnykh Sledyashchikh Sistem S Uchetom Sluchaynykh Vozdeystviy),
by V. P. Terov. 25 Sep 62, 195p. incl. illus. tables, 24 refs. (Trans. no. FTD-TT-62-623 from Gosudarstvennoye Soyuznoye Izdatel'stvo Sudostroitel'noy Promyshlennosti, pp. 167, 1961, Leningrad)
Unclassified report

DESCRIPTORS: *Radar tracking, Signal-to-noise ratio, Errors, Radar targets, Radar interference, Correlation techniques, Noise (Radar), Radar stations, Video signals, Design, USSR.

The monograph sets forth methods of computing the influence of various types of noise on the precision and range of radar-station tracking systems with line-scanning antenna beams and, in particular, radar stations operating in the circular-scanning mode. It presents simple methods of determining optimum structural diagrams for the tracking systems and computing the potential errors of automatic coordinate measurement. The material in the monograph may be used by engineers and scientific workers in designing radar tracking systems, as well as in investigation of the potential performance of such systems. (Author)

AD-287 746 Div. 6
(TISTP/TL) OTS price $1.60

Stanford Research Inst., Menlo Park, Calif.
TEMPERATURE VARIATION AND SENSITIVITY IN TWO-PHASE THERMAL IMAGE DETECTORS.
Technical rept. no. 5, (suppl. to final rept.) 1 Sep-13 Mar 59,
by Conrad Schadt. 1 Apr 59, 14p. incl. illus. table, 5 refs. (Rept. no. 17)
(Contract DA 44-009-eng-2380)
Unclassified report

DESCRIPTORS: *Thermal radiation, *Infrared images, *Detectors, *Optical systems, *Infrared radiation, Detection, Temperature, Mathematical analysis, Surface targets, Thin films, Heat transfer.

The feasibility of using an isothermal two-phase system for thermal imaging was examined. This supplement to the final report comprises a mathematical analysis of the operation of such a system, taking into account a temperature difference between the two phases. Through the analysis it is finally shown that the sensitivity and the temperature difference have opposite signs for all imaging films of practical thickness, where the temperature difference is defined as positive when the liquid state is warmer than the solid state; and the sensitivity is defined as positive when the ratio of liquid to solid increases when the received radiation increases. This means that there is no steady-state or stable configuration of the film, under the assumptions of one substance in two phases, subjected to the radiant fluxes assumed in this report, except for films so thick that heat conductance is negligible compared with radiative transfer. (Author)

AD-287 748 Div. 6
(TISTP/TL) OTS price $3.60

Stanford Research Inst., Menlo Park, Calif.
SURVEY OF THERMAL IMAGING METHODS.
Final rept.,
by Conrad Schadt and R. L. Kelly. 1 Sep 58, 29p. incl. tables, 11 refs. (Rept. no. 16)
(Contract DA 44-009-eng-2380)
Unclassified report

DESCRIPTORS: *Thermal radiations, *Infrared images, *Detectors, *Optical systems, *Metal films, *Infrared radiation, Detection, Waxes, Phosphors, Temperature, Surface targets, Thin films, Optical images, Mathematical analysis, Absorption, Heat of fusion, Tests.

Methods of detection of thermal images by non-scanning devices with the ultimate goal a portable device which registers an image produced by small differences in temperature of an object were studied. Radiant energy from an object must produce a latent image on a receiver, in terms of optical inhomogeneity, which can be made visible by direct optical methods. The basic requirements for a thermal imaging device are the following: (1) Temperature resolution sufficient to show differences of one degree centigrade in a black object; (2) Sufficient linear and angular resolution to show these temperature differences at a separation of 0.1 mm on a film as large as 4 x 4; and (3) A characteristic response time which allows formation of the image for an infrared exposure of one second or less. Project studies consisted mainly of theoretical investigations of the capabilities and limitations of various nonscanning systems. Those under consideration have been steady-state, triggered, and isothermal systems. (Author)

7. ELECTRICAL EQUIPMENT

AD-286 929 Div. 7
(TISTM/SJR) OTS price $2.00

Weston Instruments Div., Daystrom, Inc., Newark, N. J.
VARIABLE PRECISION METAL-FILM RESISTORS.
Final rept. on Phase I, 10 Oct 62,
by Joseph Bebel. 10 Oct 62, 75p. incl. illus.
(Contract Nobsr-77548)
Unclassified report

DESCRIPTORS: *Resistors, *Potentiometers, Specifications, Design, Tests, Noise, Aluminum compounds, Oxides, Glass, Talc, Abrasion, Metal films.

The variable, single-turn, metal-film resistors were of two sizes, with each size in both the servo- and bushing-type mounts. The substrate materials tested were Alumina, Steatite, and Pyrex. It was anticipated that substrate selection would be based upon heat dissipation, film adherence, thermal strength, and mechanical strength. It was found that all possessed these properties to the degree required. It was further found that substrate selection would be based primarily upon the obtainable surface finish, as this was the most critical factor in potentiometer performance as regards wear and noise. (Author)

AD-286 970 Div. 7
(TISTE/CAM) OTS price $9.60

Aeronca Mfg. Corp., Baltimore, Md.
FEASIBILITY STUDY AND EXPERIMENTAL MODEL OF AN OPTIMAL CONTROL SERVOMECHANISM.
Final rept., June 61-Aug 62,
by D. J. Maxwell. Aug 62, 108p. incl. illus. tables (Rept. no. 3)
(Contract DA 36-039-sc-87256)
Unclassified report

DESCRIPTORS: *Servomechanisms, *Switching circuits, *Servo motors, Feasibility studies, Linear systems, Mathematical analysis, Theory, Analog computers, Control systems, Simulation, Errors, Sensitivity, Computer logic, Model tests.

Pontrjagin's maximum principle is reviewed briefly and applied to a second-order linear system. The resultant control for time optimality is shown to be bang-bang extremal torque for step plus ramp type inputs. The closed form of the switching function which results in time optimal control is derived by integrating the system equations backwards in time. The time response (with zero overshoot) of a generalized second-order time optimal linear system to a broad class of step and ramp inputs is determined by computer simulation. It is shown how the performance of any system of the same form (one zero root and one negative real root) may be compared with the optimal system considered as the standard. A particular linear saturated system is simulated as an example. Further computer simulation is performed to determine performance degradation to switching function parameter variations and to various approximations to the optimal switching function. A feasibility servomechanism is constructed, tested and compared with linear saturated control. Feasibility is discussed in terms of tractability of optimal control theory to practical problems, implementation feasibility, and operational advantages and disadvantages. An alternate method of implementating the switching surface is described in detail. (Author)

AD-286 972 Div. 7
(TISTM/SJR) OTS price $8.60

United States Electric Mfg. Corp., New York.
RELIABILITY STUDY HIGH RATE LECLANCHE WAFER CELLS.
Final rept., 15 Apr 61-1 May 62,
by Martin Sulkes. 1 May 62, 91p. incl. illus. tables.
(Contract DA 36-039-sc-85266)
Unclassified report

DESCRIPTORS: *Dry cells, *Power supplies, Manufacturing methods, Storage, Temperature, Tests, Reliability.

Each lot of wafer batteries was stored for various temperatures and times as enumerated below and then tested: 70 F - 3 and 1 yr, 113 F - 3 mo, 6 mo; 130 F - 3 mo, 160 F - 1 mo. In addition, all lots made with a low temperature electrolyte were tested at 0 and -20 F. (Author)

AD-287 055 Div. 7, 4
(TISTM/TCG) OTS price $3.60

Florida U. Engineering and Industrial Experiment Station, Gainesville.
A FEASIBILITY STUDY OF PALLADIUM AS A HYDROGEN DIFFUSION ELECTRODE MATERIAL FOR FUEL CELLS.
Summary rept. no. 5 on Fuel Cells,
by Leon L. Chiu. 1 Oct 62, 30p. incl. illus. table, refs.
(Contract DA 49-186-502-ORD-860)
Unclassified report

DESCRIPTORS: *Fuel cells, *Palladium, *Hydrogen, *Electrodes, Gas diffusion, Theory, Chemical equilibrium, Solubility, Physical properties, Density, Transport properties, Reaction kinetics, Feasibility studies, Power supplies, Films, Materials.

Pd films as H diffusion electrodes in fuel cells were investigated and found to posses very interesting possibilities when the thickness is of the order of 100 Angstrom - or at temperatures above 200 C. Above 400 C, H transport through Pd films is found to follow a semi-logarithmic relationship, with an activation energy for diffusion of about 5.5 kcal/g-mole. At approximately 200 C, a low temperature phase having the approximate composition Pd2H forms with a heat of dissociation of about 8.5 kcal/g-mole. At temperatures below 150 C, the current density supportable by mass transport is too low to make Pd films suitable for gas diffusion electrodes in fuel cells. Additional experimental work is suggested to clarify the possibilities of using Pd as a fuel cell electrode under conditions other than those indicated above. (Author)

AD-287 122 Div. 7, 8, 26
(TISTB/LMH) OTS price $1.60

Chicago Telephone Supply Corp., Elkhart, Ind.
PRODUCTION ENGINEERING MEASURE FOR SUBMINIATURE, TRANSISTOR TYPE POTENTIOMETERS.
Quarterly progress rept. no. 4, 1 Apr-30 June 62,
by D. C. Kinsey, G. B. Erekson, and C. L. Holmes. 30 June 62, 14p.
(Contract DA 36-039-sc-85976)
Unclassified report

DESCRIPTORS: *Potentiometers, *Subminiature electronic equipment, *Subminiature electrical equipment, Design, Production, Dies, Machine tools, Manufacturing methods.

A report of the work performed on a mechanism incorporating a bridging contact designed for the control was rejected as unsatisfactory. A new contact mechanism was designed, tooled, and built. Samples incorporating this new design are presently on test. Advancements in resistance element formulations were made. These advances are being incorporated in the design of the unit and should improve the stability and reliability of the 3/8 inch diameter units. (Author)

AD-287 221 Div. 7, 4
(TISTM/SJR) OTS price $8.10

Monsanto Research Corp., Everett, Mass.
RESEARCH ON ORGANIC DEPOLARIZERS.
Quarterly progress rept. no. 4, 1 Apr-30 June 62,
by B. A. Gruber and E. A. McElhill. 30 June 62, 78p. incl. illus. 29 refs.
(Contract DA 36-039-sc-87236, Proj. 3A 99-09-002)
Unclassified report

DESCRIPTORS: *Primary batteries, *Electrolytic cells, *Organic compounds, Design, Cathodes (Electrolytic cells), Electrodes, Magnesium, Magnesium compounds, Anodes (Electrolytic cell), Bromides, Ammonium radicals, Nitrobenzenes, Carbon black, Nitro radicals, Carboxylic acids, Pyrroles, Electric discharges, Sodium compounds, Silver compounds, Polarization, Synthesis.

A total of 31 new compounds was screened for depolarizer activity. Several compounds that showed promise were investigated further in a cell which more closely simulates the conditions of discharge in a round dry cell. Of the new compounds tested, the sodium and silver salts of dinitropyromellitic acid and 2,5-dinitropyrrole showed sufficient promise for further testing. It was also shown that at appreciable current densities, ortho- and meta-dinitrobenzene have approximately the same discharge characteristics. (Author)

AD-287 518 Div. 7
(TISTM/ODN OTS price $4.60

Union Carbide Consumer Products Co., Cleveland, Ohio.
DEPOLARIZERS FOR HIGH ENERGY DENSITY THERMAL BATTERIES. PART II: OXIDES AND OXYGENATED ANIONS OF THE ELEMENTS OF GROUPS III A TO VI A,
by S. Senderoff, E. M. Klopp and M. L. Kronenberg. 15 Sep 62, 31p. incl. illus. 13 refs.
(Contract Nord-18240)
Unclassified report

DESCRIPTORS: *Power supplies, *Primary batteries, *Electrolytic cells, *Polarization, Diffusion, Additives, Oxides, Alkaline earth compounds, Alkali metal compounds, Voltage, Thermochemistry, High temperature research, Chemical reactions, Copper compounds, Theory, Chlorides, Calcium, Magnesium, Sulfates, Phosphates, Electrodes, Electric discharges, Phosphorus, Reduction, Electrochemistry.

Various sulfates, phosphates and other oxygenated anions and oxides of Groups III A to VI A elements have been shown to be effective depolarizers for thermal batteries at temperatures above 500 C. Polarization curves, chronopotentiometric studies and diffusion measurements used to elucidate the mechanism of the electrode reactions indicate that in the case of sulfates, the pyrosulfate ion is the active species at the cathode and that S is a probable end-product of reduction. In the case of phosphates a complex mixture exists at the cathode which is reduced by one or more steps to P. Large numbers of cell discharge tests were run which confirmed the large energy density potentially available in cells depolarized by these materials. (Author)

AD-287 519 Div. 7, 8
(TISTE/CRJ) OTS price $7.60

Westinghouse Electric Corp., Pittsburgh, Pa.
HEAT DIODE CONVERTER.
Interim scientific rept. no. 5, 1 May-31 July 62. 20 Aug 62, 1v. incl. illus. table, 9 refs.
(Contract AF 33(616)8262)
Unclassified report

DESCRIPTORS: *Thermionic emission, *Diodes, *Electric power production, Rhenium, Materials, Electric fields, Tantalum compounds, Carbides, Voltage, Electric currents, Discharge tubes, Ionic current, Refractory materials, Thermal conductivity, Vapors, Rubidium, Temperature, Cesium, Theory

Contents:
Current-voltage characteristics of materials in variable spacing cell
Measurements in plasma anode discharge cell
Electron and ion emission from cesium coated refractory metals in electric fields
Electron reflection measurements
Rubidium vapor thermal conductivity

AD-287 533 Div. 7
(TISTM/ODN) OTS price $2.60

Frankford Arsenal, Philadelphia, Pa.
HALL EFFECT POTENTIOMETER STUDY,
by Theodore A. Cox. Oct 62, 29p. incl. illus. table, 5 refs. (Memo. rept. no. M63-15-1)
(Proj. 5W13-01-008)
Unclassified report

DESCRIPTORS: *Potentiometers, *Hall effect, Magnetic fields, Tests, Manufacturing methods, Materials, Impedance, Stability, Electric currents, Voltage, Theory.

Application of the Hall effect for use as a brushless potentiometer was investigated. A literature survey was made of Hall effect devices available. Several types were procured and qualitative tests were conducted to determine what characteristics existed and to what extent. These characteristics which are pertinent for use as a potentiometer were checked. Magnetic and Hall device configurations were fabricated and tested for resolution, input impedance, output impedance, linearity, temperature stability and total available outputs. A study of available information was then made to determine theoretical limitations of performance of the Hall effect device. These findings are presented such that limitations of this device may be predicted, from the Hall effect characteristics of the best materials and possible modification of the Hall effect material for required applications. (Author)

AD-287 554 Div. 7
(TISTW/RD) OTS price $.75

Diamond Ordnance Fuze Labs., Washington, D. C.
A SURVEY OF TRANSDUCER RESEARCH AT DOFL,
by Virginia Ann Johnson. 30 July 62, 29p. incl. illus. 14 refs. (Rept. no. TR-1036)
Unclassified report

DESCRIPTORS: *Transducers, Magnetic fields, Acceleration, Electrostatic fields, Chromatographic analysis, Physical properties, Chemical properties, Instrumentation, Light, Colors, Ordnance laboratories.

A survey was made of transducer research at the Diamond Ordnance Fuze Laboratories. Research and Development work was reported on measurement devices for acceleration, coherent light, color, electron density, electrostatic fields, gas chromatography, magnetic fields, nuclear radiation, pressure, temperature, and velocity. The need, method of attack, and the state of progress are indicated. (Author)

AD-287 570 Div. 7
(TISTM/BRW) OTS price $3.60

RCA Defense Electronic Products, Princeton, N. J.
APPLIED RESEARCH PROGRAM ON HIGH-TEMPERATURE RADIATION-RESISTANT SOLAR-CELL ARRAY.
Quarterly technical progress rept. no. 2, Aug-Oct 62.
31 Oct 62, 32p. incl. illus. tables (Rept. no. AED 1668)
(Contract AF 33(657)8490)
Unclassified report

DESCRIPTORS: *Solar cells, Gallium compounds, Arsenides, Electric connectors, Soldered joints, Electric currents, Measurement, Mechanical properties, Silicon, Radiation effects, Design, Tests.

Progress is reported on GaAs cell development and fabrication for temperature, radiation,

and array configuration testing. Cell efficiences of 7.5% were obtained. Good results were obtained with Au-plated Ni tabs for cell interconnection. These were soldered with 60/40 Sm/Pb solder with flux and a subsequent cleaning operation which gave better connections than a high-temperature solder. Ten cells selected for standards showed little change when remeasured outdoors. Typical variation of open circuit voltage, maximum power point voltage, and efficiency from -25 to 200 C are shown. Array design and testing was conducted to evaluate cell tabbing techniques and to develop alternate methods. A test was established in which tab bonding strengths under shear loading was measured. Breaking loads did not appear to correlate with soldered areas.

AD-287 683 Div. 7
(TISTP/LMH) OTS price $2.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE ENERGY METHOD OF INVESTIGATING THE STABILITY AND SELFOSCILLATIONS OF CONTROLLED SYSTEMS,
by I. F. Kavinov. 10 Oct 62, 24p. incl. illus. 6 refs. (Trans. no. FTD-TT-61-465 from Nekotoryye Voprosy Analiza i Sistem Avtomaticheskogo Regulirovaniya, Sbornik Statey, Oborongiz, Moskva, pp. 52-69)
Unclassified report

DESCRIPTORS: *Control systems, *Oscillations, Feedback, Stability, Harmonic analysis, USSR

AD-287 687 Div. 7
(TISTB/LMH) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
A METHOD FOR DETERMINING THE CHARACTERISTIC IMPEDANCES AND DEGREE OF MISMATCH OF TWO-TERMINAL PAIR NETWORKS,
by L. N. Dmitriyeva. 11 Oct 62, 4p. incl. illus. (Trans. no. FTD-TT-62-481 from Soviet Patent no. 132716 (652042/26) 25 Jan 60)
Unclassified report

DESCRIPTORS: *Electrical networks, *Phase shifters, Electronic circuits, Impedance, Terminal switches, Electrical terminals, USSR.

Methods are known for determining the characteristic impedances and degree of mismatch of 2-terminal pair networks by using balanced and unbalanced bridges. These methods do not provide sufficiently high measurement accuracy of the characteristic impedances of 2-terminal pair networks and matching of 2-terminal pair networks in themselves and with the circuits in which they are connected. In the method described, this drawback is eliminated by the fact that the degrees of mismatch are determined by the difference between the phase shifts obtained when connecting the 2-terminal pair network and its load in parallel with the load of the cathode follower. The characteristic impedance is determined by the impedance of the load of the 2-terminal pair network at which there is no difference between the phase shifts. (Author)

AD-287 706 Div. 7, 5
(TISTP/WH) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
A MAGNETIC DRIVE,
by O. A. Motovilov and S. N. Dekha. 9 Oct 62, 5p. incl. illus. (Trans. no. FTD-TT-62-1143 from Soviet Patent no. 143099 (720432/25) 6 Mar 61)
Unclassified report

DESCRIPTORS: *Magnetic drives, *Vacuum systems, USSR.

AD-287 816 Div. 7
(TISTM/ODN) OTS price $7.60

Gulton Industries, Inc., Metuchen, N. J.
THE TESTING OF HERMETIC SEALS AND SEPARATORS, POSITIVE PLATE STUDIES, AND INVESTIGATIONS ON THE UNIFORMITY OF SEALED NICKEL-CADMIUM CELL
Final rept., 1 July 60-30 June 62 on Investigations leading to the Development of Improved Sealed Nickel-Cadmium Batteries,
by H. N. Seiger. 30 June 62, 71p. incl. illus. tables, 19 refs. (Rept. no. 8)
(Contract DA 36-039-sc-85390, Proj. 3A9909002)
Unclassified report

DESCRIPTORS: *Storage batteries, *Alkaline cells, *Battery separators, Nickel, Cadmium, Electrodes, Voltage, Oxygen, Reliability, Seals, Tests, Storage, Ceramic materials, Amides, Propenes, Polymers, Pressure, Processing, Deterioration.

Cells were charged and then discharged with and without an 8 hour stand period. Capacity was decreased by an average of 9% when the cells were on open circuit for 8 hours after charge. The capacity dependence upon charge rate was determined after a 24 AH input. Findings were similar to those observed previously for 12 AH input and also for that input required to produce no significant changes in pressure. Charging 6 AH cells at -20 F and 100 ma resulted in overcharge pressures averaging about 80 PSIG. The discharge capacity at C/2 averaged 2.8 AH to 1.0 volt and 3.4 AH to 0.6 volt. The O evolution from positive electrodes was measured for stand periods ranging up to 6 months, and the experiment was repeated with stands ranging to 2.5 months. The 2 sets of data were in agreement. Discharge of the electrodes indicated a capacity lo s other than that which may be accounted for by loss of O. X-ray diffraction patterns indicated greater crystallinity of electrodes discharged after being stored for 6 months at 50 C than for electrodes stored 2.5 months at 10 C. (Author)

AD-287 865 Div. 7, 26
(TISTM/EJH) OTS price $1.60

Ray-O-Vac Co., Madison, Wis.
LOW TEMPERATURE BA-2270/U-XLT-1 BATTERIES.
Interim rept. no. 4, 15 Aug 61-31 July 62, 11p. tables.
by J. W. Paulson. 31 July 62, 11p. tables.
(Contract DA 36-039-sc-78144)
Unclassified report

DESCRIPTORS: *Low temperature batteries, *Storage batteries, *Dry cells, *Power supplies, Electrolytes, Lithium compounds, Chlorides, Bromides, Failure (Mechanics), Corrosion, Zinc electrodes, Battery separators, Storage, Temperature, Electric discharge, Production.

Division 7 - ELECTRICAL EQUIPMENT

Twenty-four months delayed testing results are reported for the LiCl:CP-2 low temperature LeClanche system. Discharge tests were run at 700 F, -20 F and -40 degrees F, after 24 months storage at both 70 F and 35 F. Problems caused by electrolyte leakage, preferential zinc corrosion, etc., are discussed along with their effect on performance. (Author)

AD-287 883 Div. 7
(TISTP/FR) OTS price $.50

Aeronautical Research Lab., Office of Aerospace Research, Wright-Patterson Air Force Base, Ohio.
A PORTABLE LOW-LEVEL LIGHTMETER. III.

TRANSISTORIZED DC TO DC POWER CONVERTER.
Report on Research on the Quantum Nature of Light, by Myron H. Yang. Aug 62, 4p. incl. illus.
(Suppl. 3 to rept. no. ARL-62-415)
(Proj. 7072)

Unclassified report

DESCRIPTORS: *Power supplies, Vibrators, Transistors, Selenium rectifiers, Photometers.

A modification for the power supply unit for the low-level light meter, ARL 62-415, was made by replacing the conventional relay-type vibrator with power transistors. Advantages in power consumption and reliability of this modification are discussed. (Author)

8. ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-286 907 Div. 8, 26
(TISTE/CRJ) OTS price $6.60

Lansdale Div., Philco Corp., Pa.
PEM FOR TRANSISTOR MANUFACTURING PROCESS IMPROVEMENT.
Quarterly progress rept. no. 1, 30 Apr-31 July 62, by J. Sanders. 31 July 62, 1v. incl. illus. tables (Rept. R-232.1)
(Contract DA 36-039-sc-86720)
Unclassified report

DESCRIPTORS: *Transistors, *Manufacturing methods, Reliability, Stresses, Storage, Operation, Encapsulation, Electrodes, Temperature, Seals, Degasification, Chemical milling, High temperature research, Production.

A production engineering measure was studied for improvement of production techniques to increase the reliability for the jet etch transistor type 2N501A, with a maximum operating failure rate of 0.01% per 1000 hours at a 90% confidence level at 25 C as an objective. Efforts were made to improve the following seven manufacturing processes: (1) plating edge definition, (2) higher temperature alloys, (3) lead attachments (includes collector attachments), (4) controlled formation of surface oxides for surface stabilization, (5) gettering techniques for encapsulating and sealing, (6) thermal dissipation of package, and (7) leak determination. Establishment of a pilot line to incorporate these process improvements is reported. Preliminary operating stress data on transistors fabricated on the pilot line indicates an improvement in power handling capability as a result of the process improvements completed. Problems associated with operating stress testing and with obtaining correlation between operating stress testing and storage stress testing are discussed. (Author)

AD-286 909 Div. 8
(TISTM/EJH) OTS price $3.60

Radio Corp. of America, Somerville, N. J.
PRODUCTION ENGINEERING MEASURE ON 2N1708 SILICON PLANAR EPITAXIAL TRANSISTOR.
Quarterly rept. no. 1, 1 May-31 July 62, by A. A. Dunham, G. F. Granger, and W. L. Totten. 31 July 62, 26p. incl. illus. tables.
(Contract DA 36-039-sc-86729)
Unclassified report

DESCRIPTORS: *Transistors, *Semiconductors, *Silicon, Electronic switches, Production, Manufacturing methods, Thin films, Ceramic materials, Single crystals, Stresses, Thermal stresses, Failure (Mechanics), Test methods, Design, Materials.

Step-stress tests were performed on 24 units. All devices subjected to the temperature step-stress test failed between 360 and 380 C due to a fundamental design limitation. The results of the power step-stress test (all devices failed between 760 mw and 1020 mw) are questionable because of wiring-induced oscillations. Samples of the initial ceramic stem design were subjected to a 600 C thermal shock test. All samples remained hermetic after the test, however, resistance in the thin metallization, to which the silicon pellet is soldered, were encountered. A design revision, consisting of a metal platform brazed to the metallization, was incorporated as a means for eliminating these high resistances. The modification solved the high resistance problem and improved the thermal resistance of the package. The flange thickness was increased to provide greater resistance to distortion. Ni plating was substituted for Fe plating on the Mo leads to eliminate corrosion. A pilot line operation was established to evaluate potential process improvements. (Author)

AD-286 913 Div. 8
(TISTE/OHD) OTS price $2.60

Sperry Gyroscope Co., Great Neck, N. Y.
BEAM-TYPE PARAMETRIC AMPLIFIER.
Technical note no. 6, 1 Apr-30 June 62, by R. Eng, I. Itzkan, and E. Cheatham. July 62, 17p. illus. 2 refs. (Rept. no. NA-8210-8264-6)
(Contract AF 30(602)2433, Proj. 5573)
(RADC TDR 62-413) Unclassified report

DESCRIPTORS: *Parametric amplifiers, *Microwave amplifiers, Electron beams, Coupling circuits, X band, K band, Broadband, Narrowband, Noise (Radio), Mathematical analysis, Propagation, Helixes, Electron guns, Wave transmission, Cyclotrons, Radiofrequency oscillations, Design.

The Kompfner dip experiment using 2 couplers was performed, and the result verified the theoretical Kompfner dip length, beam-to-circuit synchronization, and theoretical power-transfer equation. The effects of axial beam velocity spread by controlling the cathode magnetic-flux linkage were investigated for signal transmission and signal transfer. The narrowband characteristics of the Kompfner dip as a function of frequency is discussed, and the possible solution is shown. A low-frequency oscillation at synchronous voltage to the in-phase mode was observed; good termination at one end of the coupler is the solution to the problem. The experimental result of a pump-circuit study is presented. A pump circuit was designed for a specified gain. (Author)

AD-286 918 Div. 8, 26
(TISTE/CRJ) OTS price $1.60

Westinghouse Electric Corp., Newbury Park, Calif.
ADVANCED ASSEMBLY TECHNIQUES FOR CAMERA TUBES.
Interim rept. no. 1, June-Sep 62, by Vert Upshaw. Sep 62, 8p. illus.
(Contract AF 33(657)8675)
Unclassified report

DESCRIPTORS: *Camera tubes, *Manufacturing methods, Cathodes (Electron tubes), Sensitivity, Seals, Degasification, Indium, Water vapor, Spectrographic analysis, Processing, Gases, Analysis, Production.

Advanced assembly techniques to be used in making camera tubes were investigated. Photocathode processing is being done in a vacuum bell jar assembly station. S-11 and S-20 surfaces are made on glass sub-strates, transported by means of manipulators to an assembly position and sealed into a complete tube. Sensitivities range to 30 microamperes per lumen for S-11 to 100 microamperes per lumen for S-20 surfaces. Considerable loss of sensitivity occurs during the transfer operation. Gas analysis is being done to identify harmful gases present, in order to eliminate loss of sensitivity. Indium seal quality is very good with checks made by mass spectrometer and attached ion gauge/pump. Preliminary work on cold metal to glass seals is described. (Author)

AD-286 928 Div. 8, 20, 25
(TISTE/OHD) OTS price $11.50

Air Force Inst. of Tech., Wright-Patterson Air Force Base, Ohio.
DESIGN AND CONSTRUCTION OF A FAST NEUTRON SPECTROMETER USING SOLID STATE DETECTORS.
Master's thesis,
by Phillip Darden Weinert. May 62, 144p. incl. illus. 33 refs. (Rept. no. GNE/Phys/62-17)
Unclassified report

DESCRIPTORS: *Neutron spectrometers, *Neutron detectors, Semiconductors, Solid state physics, Neutron counters, Nuclear physics, Helium bombardment, Pulse counters, Electronic circuits, High pressure research, Programming, Computers, Van de Graaff generators, Zirconium, Proton bombardment, Targets, Pulse integrators.

A fast neutron spectrometer was designed and constructed. The spectrometer uses He3 gas at 1500 psi as the reacting medium for fast neutrons and solid state detectors to detect the product particles. Investigation is made into geometry and materials to use to obtain optimum use of the solid state detectors. A digital computer program is presented to calculate and plot the energy and angular distribution of the products of the reaction. To prepare targets for neutrons production with a Van de Graaff generator, two means of obtaining a thin metallic coating on a target disc are investigated. These are ion sputtering and reduction of a metal from a new metallic compound, Zr(TFA)4. Some experimental data is obtained concerning the ion sputtering process. (Author)

AD-286 973 Div. 8
(TISTE/CAM) OTS price $3.60

Gordon McKay Lab. of Applied Science, Harvard U., Cambridge, Mass.
PERIODIC CYLINDER ARRAYS AS TRANSMISSION LINES,
by Joshua Shefer. 15 June 62, 10p. incl. illus. tables, 14 refs. (Scientific rept. no. 14 (Series 2)
(Contract AF 19(604)4118, Proj. 5635)
(AFCRL 62-548)
Unclassified report

DESCRIPTORS: *Cylindrical bodies, *Transmission lines, Waveguide couplers, Coupling circuits, Wave transmission, Propagation, Partial differential equations, Fourier analysis, Impedance matching, Radiofrequency power, Experimental data, Theory.

Periodic structures of conducting cylinders were used as radiators (Yagi antennas), and as slow-wave lines in traveling-wave tubes and masers. It is shown that a non-resonant structure may have interesting capabilities as an open surface-wave transmission line. By means of a relatively simple matching network, efficient excitation of a surface-wave on the periodic line was obtained. Response was flat over a 20% frequency range at x-band for several combinations of cylinder lengths and spacings. Total insertion losses are less than 3 db and largely independent of length of transmission line. Conducting cylinders were embedded in styrofoam. The effects of bends and twists in the line were investigated. It is shown experimentally that a guided wave on this periodic structure can follow a circular path having 1.5 lambda radius of curvature with very little loss. By terminating the transmission line with short circuits at both ends, a discreet series of transmission maxima was observed. (Author)

AD-286 978 Div. 8
(TISTP/TL) OTS price $4.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
CRITERIA FOR MINIMAL WEIGHTS FOR REGULAR SWITCHING FUNCTIONS.
Technical rept. on Mathematics,
by Sze-Tsen Hu. Mar 62, 1v. 15 refs. (Rept. no. 6-90-62-41)
Unclassified report

DESCRIPTORS: *Linear programming, *Switching circuits, *Function, Computer logic, Inequalities, Equations.

An analysis is presented which describes an algorithm for applying linear programming to the problem of determining whether or not a given function is linearly separable, and if so, what are the weights and threshold values required to form the separating system. The particular method which is implemented here by linear programming is based upon the application of successive approximation, and is described. The simplex method of linear programming is used; its application to the complete system of equations is described, along with a modification which considers the various weight values only, eliminating the threshold value. (Author)

AD-286 983 Div. 8
(TISTE/CAM) OTS price $5.60

Microwave Associates, Inc., Burlington, Mass.
REFINEMENT PROGRAM ON ELECTRON TUBE S-BAND TR EST-27.
Final rept., 29 Apr 60-31 Aug 62,
by R. Tenenholtz and E. Vitagliano. 31 Aug 62, 53p. incl. illus. tables (Rept. no. 6)
(Contract DA 36-039-sc-85316)
Unclassified report

DESCRIPTORS: *Transmit receive tubes, *Radiofrequency filters, Design, S band, Cavity resonators, Tuning devices, Yttrium compounds, Standing wave ratios, Waveguide windows, Electrical properties, Miniature electronic equipment, Transmission lines, Coupling circuits, Production, Tests.

Final design, fabrication and tests were performed on 9 units of the improved mechanically tunable EST-27 S-band tr tube. A discussion of techniques employed in construction is presented along with a comparison of performance and required specifications. Final design, fabrication and tests were performed on 2 electronically tunable units operationally equivalent to the mechanically tunable version. A tunable yig filter is used in conjunction with a conventional broadband tr tube. A discussion is presented on the problems encountered and methods employed in their solution. Performance data on the tr section, yig filter and combination of both are given. A comparison is made with respect to required specifications. Characteristics suitable for crystal protection are obtained in both the mechanically tunable and electronically tunable versions. The latter has the further advantages of lower insertion loss and elimination of the keep-alive requirement for the tr tube. Further improvement of the yig filter was attained when the tuning range was extended and a miniaturized package fabricated. (Author)

AD-286 993 Div. 8
(TISTE/CRJ) OTS price $2.60

Westinghouse Electric Corp., Baltimore, Md.
3.0-MILLIMETER WAVELENGTH DUPLEXER.

Quarterly progress rept. no. 1, 15 Apr-15 July 62,
by James D. Woermbke and Stafford D. Schreyer.
15 July 62, 24p. incl. illus. (Rept. no. 1)
(Contract DA 36-039-sc-89223)
Unclassified report

DESCRIPTORS: *Radar duplexers, *Transmit-receive tubes, *Switching circuits, Extremely high frequency, Waveguides, Microwave equipment, Electrodes, Gases, Design.

The 3.0-millimeter wavelength duplexer program concerns the development of two gas switching devices for receiver protection over a frequency band of 91 to 96 kmc. One tube is a dual TR tube for use in a balanced duplexer and the other tube is a crystal protector. The balanced duplexer shall operate at peak power levels of at least 10 kw and a duty cycle of 0.0005 while the crystal protector shall provide receiver crystal protection from peak power levels from 50 milliwatts to 1000 watts at a 0.0005 duty cycle. Both tubes will be built in RG-99 rectangular waveguide. The crystal protector tube will mate with UG-387/U cover flanges since the related microwave components are presently being developed in this waveguide size, while the dual TR tube will mate with the flanges on the TRG 3-db hybrid couplers. A study program will be conducted in parallel with tube development to investigate the methods and the problems associated with duplexing in circular waveguide. ' (Author)

AD-286 996 Div. 8, 25
(TISTB/LMH) OTS price $2.60

Microwave Lab., Stanford U., Calif.
MICROWAVE RESEARCH.
Quarterly status rept. no. 14, 1 May-31 July 62.
Sep 62, 22p. incl. illus. 10 refs. (M.L. rept. no. 952)
(Contract Nonr-22548)
Unclassified report

DESCRIPTORS: *Microwaves, *Microwave equipment, *Microwave networks, Space charges, Frequency multipliers, Klystrons, Electron beams, Parametric amplifiers, Nonlinear systems, Masers, Semiconductors, Ferrites, Propagation, Plasma physics, Electron tubes, Scientific research.

Contents:
General studies of space-charge waves
Transverse-wave frequency doublers
Parametric refrigeration
Nonlinear quantum effects
Theoretical maser research
Optical masers
Ferrite nonlinear propagation
Acoustic-wave amplification studies
Generation of submillimeter wavelengths
Plasma harmonic generation
Electron beam interaction theory

AD-287 002 Div. 8, 25
(TISTM/ODN) OTS price $.75

Southampton U. (Gt. Brit.).
THE RESPONSE OF A MODEL STRUCTURE TO NOISE.
PART I. FLAT PANELS.
Interim rept. on Metallic Materials Dec 60-Nov 61,
by R. D. Ford. July 62, 22p. incl. illus. tables, 5 refs.
(Contract AF 61(052)504, Proj. 7351)
(ASD TDR 62-706, pt. 1)
Unclassified report

DESCRIPTORS: *Noise, *Alloys, *Vibration, Structures, Frequency, Acoustics, Theory, Mathematical analysis, Strain gages, Stresses, Metals, Sheets.

A model structure consisting of a large flat sheet, subdivided into small regular panels by frames and stringers was excited by discrete frequency noise in an acoustic laboratory. The response of the panels was studied in detail and the fundamental stringer-twisting and stringer-bending modes were identified. The main response of each panel consists of a number of closely spaced resonances, all of which appear to be variations of the fundamental fully-fixed panel mode. The variations can occur by virtue of the panel coupling to the adjacent panels and to the stringers and frames in a variety of different ways. A Rayleigh-Ritz energy method was used to calculate the frequencies of vibration of the fundamental stringer-twisting and stringer-bending modes and also a number of intermediate regular modes which could theoretically exist. Attempts were made to calculate the response of the structure to the applied noise pressures in certain modes of vibration and an order of magnitude agreement was obtained in the stringer-twisting mode. (Author)

AD-287 014 Div. 8, 1
(TISTE/OHD) OTS price $13.00

American Machine and Foundry Co., Alexandria, Va.
SOLID STATE MATRIX.
Rept., 1 Apr-30 Oct 62 on Phase I,
by R. N. Stock and R. W. Powell. 30 Oct 62,
180p. incl. illus. tables.
(Contract AF 33(657)8688, Proj. 8128)
Unclassified report

DESCRIPTORS: *Electric switches, *Electronic switches, *Solid state physics, Aircraft equipment, Switching circuits, Electronic circuits, Direct current, Alternating current, Power supplies, De-icing systems, Transmission lines, Reliability, Generators, Electric relays, Circuit breakers, Semiconductors, Rectifiers, Electric power production, Transistors.

Effort was continued to develop an efficient and practical solid state transmission link (electrical power switching system) that will have positive advantages over the conventional electromechanical transmission links used in present-day aircraft. Primary emphasis was on reliability and long life. Presented are the general specification for the solid state system, the extent of advantage of a solid state transmission link, and a detailed work plan. (Author)

AD-287 034 Div. 8, 26
(TISTE/CRJ) OTS price $3.60

Microwave Associates, Inc., Burlington, Mass.
VARACTOR DIODE INDUSTRIAL PREPAREDNESS MEASURES.
Quarterly progress rept. no. 9, 26 June-25 Aug 62.
25 Aug 62, 16p. illus.
(Contract DA 36-039-sc-85941)
Unclassified report

DESCRIPTORS: *Diodes, *Semiconductors, *Manufacturing methods, Packaging, Aluminum compounds, Oxides, Glass, Silicon, Processing, Variable capacitors, Electrostatic capacitance, Tests, Reliability, Production.

Efforts were continued on the establishment of a capability to mass-produce a variable capacitance microwave diode. This diode, known as a ''varactor diode'', is a silicon diffused mesa

device. Present work concerned: (1) the semi-automation of the hydraulic adjust; (2) the completed package assembly; (3) the glass diode; and (4) the axial pill diode. The semi-automation of the hydraulic adjust is discussed in detail and indicates an increase in production output along with improved reliability. (Author)

AD-287 035 Div. 8, 25
(TISTP/WH) OTS price $3.60

Cruft Lab., Harvard U., Cambridge, Mass.
A PHOTOCONDUCTIVE PROBE FOR MEASURING ELECTROMAGNETIC FIELDS,
by Keigo Iizuka. 25 July 62, 19p. illus. 17 refs. (Technical rept. no. 374)
(Contract Nonr-186632, Proj. NR 371-016)
Unclassified report

DESCRIPTORS: *Electromagnetic fields, *Antenna radiation patterns, *Photoelectric cells, *Magnets, Instrumentation, Dipole antennas, Measurement.

Probes were constructed for measuring the intensity of the electromagnetic field in which the usual connecting leads between the probe and the detector are eliminated. The new devices are modulated reradiating or scattering antennas that consist of either a small dipole (for measuring E) or a small shielded loop (for measuring H) center-loaded with a photo cell illuminated by a chopped beam of light. The modulated scattered signal from the probe is proportional to either the component of the E field which is parallel to the axis of the dipole, or to the component of the H field which is perpendicular to the plane of the shielded loop. The scattered signal is received by an additional antenna or by the same antenna as is used for transmission. The received signal is amplified by a lock-in amplifier. The same principle was applied to the measurement of the distribution of current along an antenna with arbitrary shape. (Author)

AD-287 036 Div. 8, 25
(TISTP/WH) OTS price $2.60

Cruft Lab., Harvard U., Cambridge, Mass.
RADIATION FROM A LINE SOURCE IN A UNIAXIALLY ANISOTROPIC PLASMA,
by H. S. Tuan and S. R. Seshadri. 25 Aug 62, 15p. illus. 4 refs. (Technical rept. no. 375)
(Contract Nonr-186632, Proj. NR 371-016 and Grant no. 9721)
Unclassified report

DESCRIPTORS: *Plasma physics, *Electromagnetic waves, *Magnetic fields, *Electric fields, *Cerenkov radiation, Radiofrequency.

Two problems of radiation in a magnetized, incompressible plasma are investigated. The radiation characteristics of a line source of magnetic current are studied for the case in which the external magnetic field is infinite and is oriented in a direction perpendicular to that of the source. The second problem that is treated is the radiation from a uniformly moving line charge. Two cases are considered, namely: (1) when the motion of the line charge is parallel and (2) when it is perpendicular to the direction of the external magnetic field. In each case it is found that there is a Cerenkov-type radiation for frequencies less than the plasma frequency. The frequency and the angular spectrum, as well as the total energy radiated per unit path length, are determined for both cases. (Author)

AD-287 038 Div. 8
(TISTE/CAM) OTS price $2.60

Cruft Lab., Harvard U., Cambridge, Mass.
TRANSIENT RESPONSE OF LINEAR ANTENNAS DRIVEN FROM A COAXIAL LINE,
by Tai Tsun Wu, and R. W. P. King. 25 May 62, 20p. illus. 4 refs. (Technical rept. no. 370)
(Contract Nonr-186632, Proj. NR 371-016 and Grant no. 9721)
Unclassified report

DESCRIPTORS: *Dipole antennas, *Antennas, *Coaxial cables, Linear systems, Pulse generators, Electrical currents, Pulse integration, Radio signals, Reflection, Transients, Impedance, Integration, Mathematical analysis, Theory.

The initial transient response of straight wires connected to coaxial lines is studied theoretically for the case where a pulse is applied to the coaxial line. The wave form of the return pulse is first found approximately for the case of a pulse of zero rise time. Since this does not correspond to any feasible experimental situation, the effect of a finite rise time is considered in detail. Numerical results are obtained for several special cases. (Author)

AD-287 057 Div. 8
(TISTE/CAM) OTS price $1.60

Watkins-Johnson Co., Palo Alto, Calif.
DEVELOPMENT OF S-BAND LOW-NOISE PERIODIC PERMANENT MAGNETIC TRAVELING-WAVE TUBE,
by B. P. Israelsen. 20 Sep 62, 11p. incl. illus.
(Technical note no. 2; rept. no. W-J 62-604R2)
(Contract AF 30(602)2694)
(RADC TDR 62-468)
Unclassified report

DESCRIPTORS: *Traveling wave tubes, *Microwave amplifiers, S band, Magnets, Noise (Radio), Reduction, Design, Standing wave ratios, Magnetic fields, Focusing, Electron beams, Helixes, Anodes, Electron guns, Impedance matching.

The pin-seal RF input match was evaluated with excellent results. The match is better than 2:1 vswr over an octave bandwidth. A noise figure of 3.2 db was obtained at kmc using this type of match. Reversed magnetic fields were studied, using two permanent magnets. Several schemes for minimizing the reversal distance were tried. The most successful uses two small magnets at the reversal plane, opposed in the same manner as the primary magnets. With this type of assembly, beam transmission of 99 percent was achieved in dc focusing tests. (Author)

AD-287 061 Div. 8, 15
(TISTE/CRJ) OTS price $7.60

RAND Corp., Santa Monica, Calif.
THE SYNTHESIS OF CASCADE SWITCHING CIRCUITS,
by R. E. Levien. Oct 62, 69p. incl. illus. tables, 15 refs. (Memo. no. RM-3269-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Switching circuits, *Digital computers, Synthesis, Automation, Functions, Mathematical analysis, Simulation, Circuits.

The problem is considered of synthesizing switching circuits that compute a given, completely specified switching function, and a new point of view is adopted in which switching circuits are considered to be realizations of algorithms

rather than interpretations of truth-functional formulae. A restricted class of algorithms, called the cascade algorithms, is identified; it is suggested that tree and collapsed-tree, iterative, multiple-iterative sequential, and cascaded-sequential switching circuits may be viewed as realizations of cascade algorithms. All of these circuits are called, therefore, cascade circuits. Three basic techniques--functional decomposition, merging, and skipping--which permit the synthesis of efficient cascade algorithms to compute a given function, are described. It is then shown how these techniques may be applied so as to synthesize a collapsed-tree, iterative, multiple-iterative, sequential, or cascaded-sequential switching circuit that computes a given switching function. Examples are drawn from the technology of current-steering devices, such as relays and cryotrons, but the method is applicable to other technologies. The procedures appear to be well adapted to execution on contemporary digital computers. (Author)

AD-287 063 Div. 8, 26
(TISTE/OHD) OTS price $1.60

Sprague Electric Co., North Adams, Mass.
PRODUCTION ENGINEERING MEASURE FOR SUBMINIATURE TEMPERATURE-COMPENSATING CERAMIC CAPACITORS.
Quarterly rept. no. 5, 13 June-12 Sep 62,
by J. H. Fabricius and J. H. D. Folster.
12 Sep 62, 16p. incl. table.
(Contract DA 36-039-sc-85996)
Unclassified report

DESCRIPTORS: *Ceramic capacitors, *Subminiature electronic equipment, *Manufacturing methods, Rare earths, Temperature, Processing, Calcite, Oxides, Ceramic coatings, Test methods, Oxalates, Colloids, Adsorption, Failure (Mechanics), Life expectancy, Production.

Efforts were continued on the production engineering measure for subminiature temperature-compensating ceramic capacitors. Efforts toward achieving Characteristic CF are continuing. Progress was made in developing spraying capability with a slip made of the N1400 formulation and the preferred binder system. Sastisfactory dipping slips made with the preferred binder system were achieved for the NPO and N750 formulations. Some progress was made in producing a satisfactory slip of the N1400 formulation and the alternate binder system. Test results from qualification testing of Group V of Case Size I units of the N1400 formulation are satisfactory. Test results from qualification testing of Case Size II units of the N1400 formulation are satisfactory to date. The cracking and strip delamination difficulties were overcome. N750 material was selected for use in the pilot run of Case Size I units. (Author)

AD-287 147 Div. 8, 26
(TISTE/CRJ) OTS price $9.60

Bendix Semiconductor Div., Bendix Corp., Holmdel, N. J.
PRODUCTION RELIABILITY IMPROVEMENT PROGRAM FOR GERMANIUM TRANSISTOR 2N1430.
Quarterly rept. no. 1 on Production Engineering Measure,
by D. Fallon. 30 July 62, 1v. incl. illus. tables.
(Contract DA 36-039-sc-86723)
Unclassified report

DESCRIPTORS: *Transistors, *Manufacturing methods, Germanium, Reliability, Failure (Mechanics), Diffusion, Crystals, Growth, Resistance, Design, Alloys, Processing, Test equipment, Test methods, Experimental data.

Initial planning in all areas to be improved was completed. Necessary equipment set up was completed in the adaptable process areas. Control production runs were initiated and limited information obtained. Production processes, techniques, and specifications were reviewed and changes were made to improve reliability. (Author)

AD-287 162 Div. 8, 5
(TISTE/CRJ) OTS price $5.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
COMMENTARY ON A PAPER BY KUKLEV CONCERNING THE INFLUENCE OF NOISE ON A DECODING UNIT USING A PULSE CODE GROUP.
by David Middleton. 28 Dec 61, 53p. incl. illus. 10 refs. (Rept. no. 42G-1)
(Contract AF 19(604)7400)
(AFESD TDR 62-143) Unclassified report

DESCRIPTORS: *Radio signals, *Radio interference, *Communications theory, Pulse modulation, Coding, Errors, Detection, Signal to noise ratio, Identification, Mathematical analysis, Statistical analysis.

A 1959 paper by Kuklev, which discusses the effects of noise on a decoding unit employing a pulse code group of up to five pulse elements, is examined from the viewpoint of (1) the basic model assumed, (2) the validity of the approximations involved and (3) the accuracy of the calculations presented. A translation of Kuklev's paper is given. In the detailed commentary presented, the signal detection probability is obtained as a function of the input signal-to-noise (power) ratio at the input to the second detector before rectification and video limiting. This probability is obtained for conditions of both match and mismatch in the IF, and for one to five pulse elements in a code group, subject to a preset false-alarm probability of 1/1000, and to various approximations. Kuklev's basic model is found to be satisfactory and his approximations in most instances are reasonable. However, the accuracy of his calculations can be noticeably improved by more refined approximations. Calculations are presented for false-alarm probabilities different from the values considered by Kuklev. These calculations show the required increase in input signal level as the number of pulses in the code group is increased. (Author)

AD-287 164 Div. 8
(TISTM/EJH) OTS price $3.60

Radio Corp. of America, Somerville, N. J.
GALLIUM ARSENIDE VARACTOR DIODES.
Quarterly rept. no. 1, 27 June-27 Sep 62,
by H. Kressel, H. Lee and A. Solomon. 31 Oct 62, 31p. incl. illus.
(Contract NObsr-87405)
Unclassified report

DESCRIPTORS: *Diodes, *Semiconductors, *Semiconducting films, Manufacturing methods, Design, Materials, Gallium compounds, Arsenides, Electrical properties, Failure (Mechanics), Voltage.

Emphasis was placed on fabricating very high cutoff frequency diodes having breakdown voltages in excess of 6 v. Devices were fabricated using both melt-grown GaAs and epitaxial material. The results indicate that the highest cutoff frequencies were achieved using melt grown GaAs

and that the best devices fabricated have cutoff frequencies values very close to the maximum theoretical value for the material used. Twenty-five samples were completed. (Author)

AD-287 185 Div. 8
(TISTE/CRJ) OTS price $26.00

Illinois U., Urbana.
ABSTRACTS OF THE TWELFTH ANNUAL SYMPOSIUM ON THE USAF ANTENNA RESEARCH AND DEVELOPMENT PROGRAM, 16-19 OCTOBER 62 (HELD) AT ROBERT ALLERTON PARK, UNIVERSITY OF ILLINOIS, MONTICELLO, ILLINOIS. VOLUME I.
1962, 532p. incl. illus. tables, refs.
(Sponsored by Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio)
Unclassified report

DESCRIPTORS: *Antennas, *Symposia, Lens antennas, Helical antennas, Dipole antennas, Slot antennas, Loop antennas, Conical antennas, Broadband, Antenna radiation patterns, Digital computers, Programming, Radiofrequency amplifiers, Synthesis, Tracking, Phase measurement, Airborne, Radiometers, Mathematical analysis, Parabolic antennas, Measurement, Electromagnetic lenses.

Contents:
Geodesic lens antennas
Antenna arrays
Broadband antennas
Electrically loaded antenna
Non-conformal antennas

AD-287 186 Div. 8, 5
(TISTE/CRJ) OTS price $15.00

Space Technology Labs., Inc., Redondo Beach, Calif.
THE STUDY OF A METHOD TO REDUCE ELECTRON DENSITY IN THE IONOSPHERIC D-REGION BY MEANS OF HIGH-POWERED GROUND-BASED TRANSMITTERS.
Final rept.,
by Paul Molmud, Saul Altshuler, and John H. Gardner. Sep 62, 207p. incl. illus. 59 refs.
(Rept. no. 8625-6006-RU-000)
(Contract AF 19(604)8844)
(AFCRL 62-753) Unclassified report

DESCRIPTORS: *Ionospheric propagation, *Ionosphere, *Radio communication systems, *Radio transmitters, *Radio interference, *Electromagnetic waves, Gases, Electrons, Density, Heating, Measurement, Scattering, Focusing, Electromagnetic effects, Electromagnetic fields, Nuclear explosions, Electric fields, Propagation, Conductivity, Ionization, Theory, Attenuation, Radio waves, Radio signals, Mathematical analysis, Radio transmission, Reduction.

A study is made of a method of decreasing the electron density in the D-region. The method involves the heating of electrons by intense electromagnetic radiation. This increases the electron attachment rate and thereby decreases the electron density. The relevant D-layer rate processes are reviewed and incorporated into a detailed analysis of the influence of a perturbing electromagnetic pulse upon the variation, in time of the electron density. The theory of conductivity of a weakly ionized gas is reviewed and augmented to include dependency on field strength. Propagation constants are determined and the equations describing the nonlinear radial propagation of a powerful wave in a weakly ionized inhomogeneous medium are derived. Numerical solutions of these equations are obtained which describe the effects due to the vertical propagation of waves for several power levels and frequencies through a heavily perturbed D-region. It is found that the powerful wave modifies the electron density distribution. (Author)

AD-287 188 Div. 8, 22
(TISTE/CRJ) OTS price $5.60

Scintilla Magneto Div., Bendix Corp., Sidney, N. Y.
RADIO INTERFERENCE GUARD (RIG) LOW-PASS RADIO FREQUENCY ATTENUATOR.
Technical rept., 1 June-31 Oct 62,
by William P. Stevens, 31 Oct 62, 49p. incl. illus. tables.
(Contract N178-8056)
Unclassified report

DESCRIPTORS: *Radiofrequency attenuators, *Electromagnetic shielding, *Radio interference, Miniature electronic equipment, Detonators, Primers, Hazards, Electromagnetic effects, Electromagnetic fields, Electromagnetic waves, Radio waves, Attenuation, Electrostatic fields, Heat transfer, Direct current, Measurement, Mathematical analysis, Electrical networks, Coaxial cables, Ordnance, Reduction.

The Radio Interference Guard (RIG) is a miniature low-pass attenuator, and its purpose, when used in an electrical circuit, is to reduce to a negligible level the radio frequency power transmitted in the attenuation band without appreciably attenuating dc and low frequency ac in the pass band. The purpose of the RIG device is to provide adequate protection for weapon electroexplosive devices against spurious energies induced in their associated circuits by electromagnetic and electrostatic fields. The RIG device is based on the idealized concept of enclosing the electrical load inside a continuous electromagnetic shield of suitable metal and thickness to provide adequate protection against all radio frequency and electrostatic fields. (Author)

AD-287 194 Div. 8, 25
(TISTE/OHD) OTS price $2.60

Cruft Lab., Harvard U., Cambridge, Mass.
(No title).
Quarterly status rept. no. 62, 1 Oct 61-1 Jan 62, 1 Jan '62, 23p. refs.
(Contracts Nonr-186607, Nonr-186616 and others)
Unclassified report

DESCRIPTORS: *Electromagnetic waves, *Propagation, *Solid state physics, *Nuclear magnetic resonances, *Control systems, Very low frequency, Radio navigation, Multipath transmission, Velocity, Diurnal variations, Radiofrequency oscillators, Paramagnetic resonance, Ruby, Quadrupole moments, Resonance absorption, Masers, Light, Modulation, Crystals, Dielectrics, Magneto-optic rotation, Mathematical analysis, Ferromagnetic materials, Hyperfine structure.

Contents:
Very low frequency propagation
Various nuclear magnetic resonance effects
Control systems
Optimal control systems
Optimal control for dynamic systems
Topics in automatic control
Communications and networks
Microwave applications of ferromagnetic materials
Electromagnetic radiation

AD-287 196 Div. 8, 17, 22
(TISTW/PCR) OTS price $2.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
DEVELOPMENT OF BROAD-BAND ELECTROMAGNETIC ABSORBERS FOR ELECTRO-EXPLOSIVE DEVICES.
Monthly progress rept., 1-31 Aug 62,
by Paul F. Mohrbach and Robert F. Wood. 31 Aug 62, 20p. incl. illus. table (Rept. no.P-B1981-2)
(Contract N178-8087)
Unclassified report

DESCRIPTORS: *Ferrites, *Radiofrequency, Carbonyl radicals, Iron compounds, Attenuation, Radiofrequency attenuators, Metallic compounds, Oxalates, Nickel, Cobalt, Manganese, Zinc, Ceramic materials, Explosives, Powder metal, Lubricants, Binders, Wetting agents, Molding, Barium compounds, Titanates, Production, Dielectrics, Insulating materials, Instrumentation, Electromagnetic effects, Manufacturing methods, Hazards.

The relationship between the several parameters of carbonyl iron samples and the attenuation was determined. Of particular interest is the determination of which combination of parameters produces the 53 degree slope of the curve for attenuation versus frequency for this material. Attenuation measurements of one group of three ferrites were rerun at 150 to 500 mc. With the elimination of instrumentation difficulties, results are reproducible to a satisfactory degree. Readings are lower by approximately 10% but still are encouraging with respect to the apparent slope of the curve of attenuation versus frequency. Formulation of a bimetal oxalate which is decomposed at moderate temperatures yielding small particle ferrites was used to produce Ni, Co, Mn-Zn and Ni-Zn ferrites. A lubricant, binder, and wetting agent are being employed to facilitate the molding of the powder. (Author)

AD-287 223 Div. 8
(TISTE/CRJ) OTS price $.75

Radio Corp. of America, Lancaster, Pa.
IMAGE INTENSIFIER ISOCON FEASIBILITY STUDY.
Final rept., Dec 60-Feb 62 on Electronic Tube Technology,
by R. E. Hoffman. Aug 62, 26p. incl. illus. tables, 1 ref.
(Contract AF 33(616)7696, Proj. 4156)
(ASD TDR 62-529) Unclassified report

DESCRIPTORS: *Camera tubes, *Image intensifiers (Electronics), *Iconoscopes, Image tubes, Electrostatics, Focusing, Signal to noise ratio, Electron beams, Illumination, Cathodes (Electron tubes), Thin films, Magnesium compounds, Aluminum compounds, Oxides, Targets, Materials, Video signals, Display systems, Television display systems, Electrodes.

A comparison is made of the operating principles of image orthicons and image isocons. The superiority of the image isocon is shown by a graphic representation of the output signal resulting from an image of black, gray, and white stripes. Experimental intensifier image isocons having electrostatic focus intensifier section were constructed for evaluation of the performance of the combination. The tube performance is expressed in terms of resolution, aperture response, signal-to-noise ratio, and dynamic range. Information on the equipment necessary for operation of the intensifier image isocon and operating procedure is included. (Author)

AD-287 228 Div. 8
(TISTE/OHD) OTS price $1.60

Watkins-Johnson Co., Palo Alto, Calif.
DEVELOPMENT OF AN E-BAND AMPLIFIER.
Technical note no. 6, 1 Apr-30 June 62,
by E. W. Kinaman. July 62, 11p. incl. illus. table (Rept. no. W-J 62-410R24)
(Contract AF 30(602)2422, Proj. 5573)
(RADC TDR 62-424) Unclassified report

DESCRIPTORS: *Microwave amplifiers, *Traveling wave tubes, *Band-pass filters, Extremely high frequency, Cathodes (Electron tubes), Manufacturing methods, Electron beams, Electron optics, Helixes, Focusing, Impedance matching, Coupling circuits, Design, Waveguides, Waveguide filters, Cavity resonators, Spheres.

Progress was continued on the tube and filter development. In the tube area, the following took place: 99 percent transmission of the beam through the helix; stable emission of 4 amps/cm2 from the cathode face; synchronous helix voltage within 5 percent of design; 30 db electronic gain at 78 kmc. In the filter area: 3 to 3.3 db resonant and insertion loss from 70 to 85 kmc at a 3 db bandwidth of 80 to 84 Mc. Three .016 inch diameter YIG spheres of line width less than 0.5 orsted were used. (Author)

AD-287 230 Div. 8
(TISTP/WH) OTS price $8.60

New Mexico U. Engineering Experiment Station, Albuquerque.
AN APPROACH TO AZIMUTH ANGLE REFRACTION CORRECTIONS,
by Wallis R. Cramond and Donald C. Thorn. Apr 62, 91p. incl. illus. tables, 17 refs. (Technical rept. no. EE-72)
(Contract DA 29-040-ORD-1238)
Unclassified report

DESCRIPTORS: *Radar signals, *Electromagnetic wave reflections, *Atmospheric refraction, *Errors, *Radar tracking, Azimuth, Meteorological data.

Analyses of tropospheric refraction of electromagnetic waves propagating in the atmosphere have been based on a spherically symmetric medium. However, this applies only to ray bending in a vertical plane (elevation angles). Numerous methods have been developed to correct for elevation angle errors. In February 1961, the presentation of a new method for use in a nonsymmetric atmosphere revived interest in horizontal (azimuth angle) bending. In order to use this method to test the significance of azimuth angle errors, the spatial distribution of index of refraction must be known. A model which utilizes meteorological profiles to describe the lower troposphere is proposed. Since meteorological data are necessarily limited, plane surfaces are selected as the basic component of the model. The different combinations of planes are discussed and a model using parallel planes tilted with respect to a plane tangent to the earth becomes the fundamental part of a representation to be used with the nonsymmetric bending correction technique. (Author)

AD-287 288 Div. 8, 25
(TISTW/PCR) OTS price $1.10

Aerospace Information Div., Washington, D. C.
LASER PATENT,
by V. A. Fabrikant, M. M. Vudynskiy and F. A. Butayeva. 18 Oct 62, 1p. (AID rept. no. 62-168 from Patent no. 148441, Zhurnal izobreteniy, No. 13, p. 20, 1962)
Unclassified report

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

DESCRIPTORS: *Lasers, Patents, Masers, Interferometers, USSR.

A verbatim translation of a patent which appeared in the July 1962 issue of Zhurnal izobreteniy, the official Soviet patent organ, is given: A method of amplifying electromagnetic radiation based on media with a negative coefficient of absorption and distinguished by the application of a multiple passage of the signal through the amplifying medium in order to increase gain.

AD-287 296 Div. 8
(TISTE/CRJ) OTS price $3.60

General Electric Co., Auburn, N. Y.
THE RESEARCH AND DEVELOPMENT OF HIGH CURRENT AND HIGH VOLTAGE SILICON CONTROLLED RECTIFIERS.
Quarterly progress rept. no. 1, 30 June-30 Sep 62.
30 Sep 62, 1v. incl. illus.
(Contract NObsr-87648)
Unclassified report

DESCRIPTORS: *Rectifiers, *Electronic switches, *Semiconductors, Silicon, Switching circuits, Voltage, Electric currents, Electric fields, Resistance, Diffusion, Processing.

Research concerns the development of high-current and high-voltage silicon controlled rectifiers. Design consideration and approaches to the various problems are discussed. With respect to device B, junction assembly components were designed and procured for the initial (state-of-the-art) design samples. Geometry and contour of the junction structure were selected. Fixtures, tools and jigs were also designed and made. Small quantities of initial design samples were made to check-out assembly components and tooling. This check-out is progressing satisfactorily. The phase of optimization of design parameters began on schedule. (Author)

AD-287 436 Div. 8, 26
(TISTE/OHD) OTS price $1.10

General Electric Co., Schenectady, N. Y.
SILICON GROWN DIFFUSED TRANSISTOR TYPE 2N336.
Quarterly rept. no. 1, 30 Apr-31 July 62 on Production Engineering Measure.
31 July 62, 3p.
(Contract DA 36-039-sc-86727)
Unclassified report

DESCRIPTORS: *Transistors, *Manufacturing methods, Diffusion, Silicon, Reliability, Production, Surfaces, Machines, Processing, Temperature, Welding, Seals.

Effort was expended towards improving production techniques on the silicon grown diffused transistor type 2N336, with a maximum failure rate of 0.01% per 1,000 hours at a 90% confidence level at 25 C, as an objective. Two key process steps were singled out to maximize process control. The latest processing techniques were incorporated, while minimizing process variability, and at the same time greatly increasing production capability. The two specific work items are: (1) Surface Passivation; and (2) High Temperature Main Sealing. (Author)

AD-287 438 Div. 8, 26
(TISTM/EJH) OTS price $4.60

Georgia Inst. of Tech. Engineering Experiment Station, Atlanta.
AGING CHARACTERISTICS OF QUARTZ CRYSTAL RESONATORS.
Quarterly rept. no. 6, 15 May-15 Aug 62,
by R. B. Belser and W. H. Hicklin. 15 Aug 62,
41p. incl. illus. table.
(Contract DA 36-039-sc-87407)
Unclassified report

DESCRIPTORS: *Quartz resonators, *Quartz crystals, Crystals, Aging, Crystal ovens, Frequency, Resistance, Seals, Bonding, Stability, Storage, Heating, Temperature, Crystal holders, Plating, Aluminum, Gold plating, Silver plating, X-ray diffraction analysis.

Approximately 140 resonators were maintained in oven storage at 85 C and measured periodically for frequency and Rs. Of these, approximately 50 were units prepared for long term aging study and the remainder were undergoing measurements preliminary to exposure to high intensity pulsed radiation. Thirty new resonators with Al electrodes were fabricated and mounted in the HC-27/U glass container. Heat effects during sealing resulted in major frequency shifts for 12 of these units, from 10 mc to the vicinity of 22 mc, with now significant change in Rs. Frequency versus temperature data and Rs values indicated characteristics resembling an AC-cut more than an At-cut resonator. An investigation of changes in these resonators by the method of X-ray diffraction topography indicated extensive electrical twinning in the units exhibiting the frequency shift. Information concerning strains produced in the quartz by mounting clips and cements could be obtained by X-ray diffraction topography. Aging studies showed many units have high stability, but definite differences in aging rates at the fundamental and overtone modes of the same unit were observed. Overcoated units display greater aging rates than units coated only with a base coat.

AD-287 455 Div. 8, 25
(TISTE/OHD) OTS price $3.60

Litton Electron Tube Corp., San Carlos, Calif.
HIGH PERVEANCE GUN STUDY.
Quarterly rept. no. 5, 1 June-1 Sep 62,
by R. D. Harris, J. R. Hechtel and Gerold E. Pokorny. 10 Oct 62, 29p. incl. illus.
(Contract DA 36-039-sc-87413)
Unclassified report

DESCRIPTORS: *Electron guns, *Electron beams, Magnetron, Cathodes (Electron tubes), Electric currents, Voltage, Magnetic fields, Configuration, Electron accelerators, Electric fields, Design, Space charges, Particle trajectories, Focusing, Electrons, Analysis, Computers, Mathematical computer data, Electrostatics, Electron optics.

Study is given of the formation of stable and well-focused, high-perveance, large diameter hollow-beams. Both magnetron injection-type guns and Pierce-type gun derivatives were investigated. A method is given for the calculation of space charge simulation currents in the resistor network which will allow cross-overs and scalloping trajectories. Some results are given with comments as to grid size necessary for good accuracy. The electrical design for an inverted magnetron injection gun is given. Characteristics of the gun, i.e., perveance, cathode loading and stability criteria are discussed. A comparison of an inverted and conventional magnetron injection gun is given with respect to the cathode vs. beam diameter. (Author)

AD-287 463 Div. 8
(TISTE/CRJ) OTS price $3.60

Radio Corp. of America, Somerville, N. J
RESEARCH AND DEVELOPMENT ON HIGH CURRENT TUNNEL DIODES.
Interim development rept., 1 July-30 Sep 62, 30 Sep 62, 33p. incl. illus. tables.
(Contract NObsr-87540)
Unclassified report

DESCRIPTORS: *Diodes, *Semiconductors, *Inverted rectifiers, *Inverter circuits, Silicon, Germanium, Gallium compounds, Arsenides, Life expectancy, Shock resistance, Vibration, Impact shock, Electrical properties, Voltage, Electric currents, Measurement.

Device design of high-current tunnel diodes was performed for germanium, silicon, and gallium arsenide. It is concluded that silicon is inferior to germanium and gallium arsenide, while the differences between these two are too small to eliminate either one at the present time. Germanium tunnel diodes with 300-amp peak currents were fabricated with theoretical efficiencies as an inverter of up to 52%. Gallium arsenide tunnel diodes with more than 200-amp peak currents were made with efficiencies in the 40-45% range. A study was made of the diode resistances and it was determined that the resistance near the junction may be a larger factor in the total resistance than the back contact resistance. Two different test circuits were built for measuring high current tunnel diodes. A discussion of some inverter circuit work being performed on another contract is also included. (Author)

AD-287 483 Div. 8
(TISTE/CAM) OTS price $7.60

New Mexico U. Engineering Experiment Station, Albuquerque.
DEMODULATION OF A SPECIAL AM-FM SIGNAL,
by Donald W. Dearholt. Sep 60, 64p. incl. illus. 5 refs. (Technical rept. no. EE-34)
(Contract DA 29-040-ORD-1238)
Unclassified report

DESCRIPTORS: *Signal generators, *Transducers, *Detection, *Modulation, Radiofrequency, Radio signals, Amplitude modulation, Tuning circuits, Pulse discriminators, Pulse modulation, Electronic circuits, Mathematical analysis, Theory, Integration, Waveform generators.

The problem of demodulation of a signal obtained from a special generator and a special class of transducers is considered. The swept frequency range of the generator is chosen so that the resonant frequency of the transducer lies within this range for all anticipated values of the parameter to be measured. The generator output is applied to the transducer so that an amplitude peak occurs every time the generator frequency passes through the resonant frequency of the transducer. Demodulation is considered complete if correct relative values of the resonant frequency of the transducer are obtained. Possible sources of error in the peak marking circuit are considered, and ways of minimizing different types of error are discussed. Results obtained from an experimental peak marking circuit are compared with theoretical results. (Author)

AD-287 498 Div. 8, 2
(TISTP/GRW) OTS price $3.60

New Mexico U. Engineering Experiment Station, Alburquerque.
COMPARISON OF EXPERIMENTAL WITH COMPUTED TROPOSPHERIC REFRACTION,
by Wallace L. Anderson and Ralph J. Rainey. Oct 59, 22p. incl. illus. tables, refs.
(Technical rept. no. EE-28)
(Contract DA 29-040-ORD-1238)
Unclassified report

DESCRIPTORS: *Radar signals, Radar ranges, Refractive index, Meteorological data, Terrain, Test methods, Experimental data, New Mexico, Atmospheric refraction.

Limits of applicability of ray tracing in computing tropospheric refraction at White Sands Missile Range were explored. A total of 286 comparisons was made, all for a path from radar to fixed beacon of about 45 miles and an elevation angle of 18.32 mils (one mil = 3.2/pi milliradians). A horizontally stratified atmosphere was assumed. Refractive index profiles were prepared from a variety of weather data, and classified A, B, or C in descending order of reliability prior to ray-tracing calculations for each of the radar readings (165 cases); in 143 cases profiles based only on radiosonde data were also included for comparison with the A, B, or C results. Angle observations were made with an FPS-16 C-band radar having a quoted instrumental accuracy of 0.14 mils rms. Angle readings varied from 18.70 to 20.92 mils, with mean of 19.37 mils and standard deviation of 0.42 mils. For this experiment it is concluded that most of the rms elevation angle error is contributed by atmospheric uncertainties. Although ray tracing methods provide a significant correction when sufficiently good weather information is available, there still remains a large uncertainty not accounted for by equipment. (Author)

AD-287 511 Div. 8, 26, 25
(TISTE/CAM) OTS price $4.60

Texas Instruments, Inc., Dallas.
SEMICONDUCTOR RESISTIVE ELEMENT.
Quarterly rept. no. 5, 1 July-30 Sep 62,
by Rodger B. Herrington, Olin B. Cecil, and Raymond D. Puckett. 30 Sep 62, 36p. incl. illus.
(Contract NObsr-85406)
Unclassified report

DESCRIPTORS: *Semiconductors, *Resistors, *Manufacturing methods, Vapor plating, Diffusion, Silicon, Processing, Packaging, Reliability, Moistureproofing, Crystal structure, Microstructure, Resistance, Temperature, Plasma jets, Electric arcs, Gas ionization, Gold alloys, Aluminum alloys, Copper alloys, Palladium alloys, Intermetallic compounds.

Work emphasized vapor deposition of polycrystalline elements. Methods of making ohmic contact, resistance adjustment, and packaging were considered. Overload tests of encapsulated devices gave indication of a high degree of stability on operating load life at rated power. Resistance-temperature measurements were made. (Author)

AD-287 513 Div. 8, 26
(TISTM/EJH) OTS price $2.60

General Electric Co., Schenectady, N. Y.
SOLID TANTALUM CAPACITOR.
Quarterly engineering rept. no. 5, 1 July-30 Sep 62,
by Archie Broodo. 30 Sep 62, 19p. incl. illus. tables.
(Contract NObsr-85470)
Unclassified report

DESCRIPTORS: *Tantalum capacitors, *Electrolytic capacitors, Design, Processing, Manufacturing methods, Tantalum, Impurities, Anodes (Electrolytic cells), Foils, Ceramic coatings, Magnesium compounds, Dioxides, Lead, Tantalum compounds, Oxides, Foamed metals, Voltage, Electrical properties, Impregnation, Porosity.

A study of the process of extracting carbonaceous films from sintered porous anodes was completed. Samples of high purity Ta doped with 100 ppm C were rolled into one mil foil. Similar samples doped with Fe proved difficult to roll into foil. A study of scintillation conditions for leads indicates annealed leads to be superior to unannealed leads. Porosity studies indicate that anode densities greater than 7g/cc grams are easier to coat with MnO_2 than lower densities. A method of capacitance control was achieved. The effects of anode and electrolyte temperature, and the generation of gases within the electrolyte are discussed. Control of presinter conditions and proper doping with Ta_2O_5 are essential to obtaining low leakage current in foam anodes. A significant reduction in leakage is reported. A new method of applying MnO_2 was evaluated and results are reported. Foam anodes of 11 - 14 microfarad capacitance are in process. (Author)

AD-287 555 Div. 8
(TISTP/WH) OTS price $1.60

Diamond Ordnance Fuze Labs., Washington, D. C.
CHARACTERISTIC IMPEDANCE OF RECTANGULAR COAXIAL TRANSMISSION LINES,
by Orval R. Cruzan and Robert V. Garver.
26 Sep 62, 24p. incl. illus. 10 refs. (Rept. no. 1077)
Unclassified report

DESCRIPTORS: *Coaxial cables, *Impedance, *Determinants, *Numerical methods and procedures, *Simultaneous equations.

The characteristic impedance of rectangular coaxial transmission lines can be readily and accurately computed by a simple equation when the capacitance per unit length is known. While the capacitance per unit length of the parallel planes is easily calculated, the corner capacitance is a more difficult calculation. The corner capacitances for a wide range of variables were calculated by computer and are cataloged in graphical form. The calculations were made using formulas given by Skiles and Higgins, which were derived by ortho-normal block analysis. (Author)

AD-287 589 Div. 8
(TISTE/CAM) OTS price $1.60

Army Electronics Research and Development Lab., Fort Monmouth, N. J.
THE GENERATION OF CLASSES OF NONINTERFERING FREQUENCIES,
by Nello R. Castellini. May 62, 17p. incl. illus. tables, 3 refs. (ASRDL Technical rept. no. 2284)
Unclassified report

DESCRIPTORS: *Radio interference, Radio communication systems, Radiofrequency, Analysis, Theory, Reduction, Circuits, Radio charts.

The mutual interference chart gives the compatibility that exists between the channels of a radio set. This property of the chart is used to determine classes of frequencies that are compatible with given transmitting or receiving frequencies. The approach is based on the elementary theory of classes. By the use of the chart, two categories of fundamental classes can be defined: those classes that contain undesired frequencies going into interference in the presence of a given desired frequency, and those classes that contain desired frequencies which in the presence of a given undesired frequency are subject to interference. The classes of compatible frequencies resulting from these definitions are determined for circuits containing one or more half-duplex or duplex channel terminals in the simplest possible configuration on the assumption that the source of interference is local. The influence on these classes of interference from distant sources is briefly discussed. (Author)

AD-287 590 Div. 8
(TISTE/CAM) OTS price $1.60

Army Electronics Research and Development Lab., Fort Monmouth, N. J.
MIXER ACTION AND ITS INFLUENCE ON INTERFERENCE AND FREQUENCY ASSIGNMENTS,
by Nello R. Castellini. May 62, 12p. incl. illus. 1 ref. (ASRDL Technical rept. no. 2283)
Unclassified report

DESCRIPTORS: *Crystal mixers, Radio interference, Radio signals, Radiofrequency oscillators, Voltage, Radiofrequency, Propagation, Theory.

From a review of the action of the mixer under some simplifying assumptions, it is shown that, in problems of interference likely to be encountered in practice, the power of the spurious interference products can be simply expressed in terms of the undesired and of the local oscillator voltage inputs to the mixer. The construction and some of the characteristics of the mutual interference chart are briefly reviewed. An expression giving the importance of any interference product relative to the signal is developed. By the use of propagation law, this relation is expressed in terms of the field parameters. The resulting relation is useful in estimating relative importance of products or lines as a function of the distance separating desired and undesired transmitters. The role of these relations and the chart in developing systems of frequency assignments is briefly outlined. (Author)

AD-287 609 Div. 8, 26
(TISTM/RGR) OTS price $5.60

Bliley Electric Co., Erie, Pa.
PRODUCTION ENGINEERING MEASURE - CR-(XM-45)/U QUARTZ CRYSTAL UNITS - HIGH SHOCK AND VIBRATION RESISTANT, LOW FREQUENCY.
Quarterly progress rept. no. 1, 8 May-31 July 62, by J. M. Wolfskill, A. R. Krespan and Robert Mouck. 31 July 62, 58p. incl. illus. tables. (Contract DA 36-039-sc-86719)
Unclassified report

DESCRIPTORS: *Quartz resonators, Low frequency, Reliability, Manufacturing methods, Test equipment, Quartz crystals.

CR-(XM-45)/U type quartz resonators cannot utilize +5 degree X cut crystal resonators, even though all the parameter requirements are such that +5 degree X crystals would be the only logical choice. Some alternate crystal resonators which can achieve better frequency stability at 70-80 C than the +5 degree X cuts but which have comparable electrical parameters to the +5 degree X's are being studied. (Author)

AD-287 611 Div. 8
(TISTP/WH) OTS price $2.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
SOME RESULTS IN THE THEORY OF ACTIVE NETWORKS,
by Dante C. Youla. 16 Aug 62, 22p. incl. illus. 3 refs. (Research rept. no. PIBMRI-1063-62)
(Contract AF 30(602)2213)
(RADC TDR 62-415) Unclassified report

DESCRIPTORS: *Electrical networks, *Circuits, *Matrix algebra, *Differential equations, *Linear systems.

Bounds are derived on the Floquet exponents of systems created by embedding linear periodic elements in passive networks. A real-frequency stability test is established for the undriven response of varactor-like devices coupled through linear, stable, time-invariant n-ports. (Author)

AD-287 630 Div. 8, 30
(TISTP/WH) OTS price $1.60

Aerojet-General Corp., Azusa, Calif.
BUILDING BLOCK STUDY.
Quarterly rept. no. 5, 1 Apr-30 June 62,
by B. W. Vinton. 30 June 62, 16p. illus. tables.
(Rept. no. 0447-01-5)
(Contract DA 36-039-sc-85159, Proj. 3G89-01-001-01)
Unclassified report

DESCRIPTORS: *Electronic equipment, *Maintenance, *Test equipment, *Phase modulation, *Frequency modulation.

The requirements and the formulation of concepts for the design of an integrated system of modular test equipment to provide a capability for automatic field maintenance testing are treated. (Author)

AD-287 650 Div. 8, 7, 14
(TISTE/PAR) OTS price $5.60

Aeronautical Electronic and Electrical Lab., Naval Air Development Center, Johnsville, Pa.
DEVELOPMENT OF MICROELECTRONIC CIRCUITS FOR LINEAR APPLICATIONS.
Final rept.,
by H. B. Martin. 16 Oct 62, 51p. incl. illus. tables (Rept. no. NADC-EL-6264)
(In cooperation with General Electric Co., Syracuse, N. Y., Contract N62269-1335)
Unclassified report

DESCRIPTORS: *Tantalum capacitors, *Thin films, *Microminiaturization (Electronics), *Dielectric films, Oscillators, Audio amplifiers, Tuned amplifiers, Oxides, Lead compounds, Titanates, Titanium compounds, Tantalum compounds, Dioxides, Aluminum compounds, Electrodeposition, Processing, Manufacturing methods.

Thin film capacitors with a large value of capacitance per unit area were fabricated from stacking a.c. anodized tantalum films. Several stacks containing four capacitors each had a capacitance equivalent to 4 microfarads/sq. in. and a dissipation factor of about 6%. The glow discharge method of depositing thin dielectric films was also studied. After solving the vapor pressure problem of the titanium feed material, it became possible to produce TiO_2 deposits consistently. $PbTiO_3$ deposition was also investigated to a limited extent. The main problem in the $PbTiO_3$ film production is the stoichiometry of the deposited layer. The RC oscillator, tuned amplifier and audio amplifier were designed and fabricated using thin films and microelectronic components. (Author)

AD-287 745 Div. 8
(TISTP/LMH) OTS price $1.60

Stewart-Warner Corp., Chicago, Ill.
ELECTRONIC PACKAGED SUBASSEMBLIES USING MECHANICAL METHODS FOR ELECTRICAL INTERCONNECTIONS BY THE USE OF THE STEWART-WARNER ELECTRONICS MECHANICAL ASSEMBLY TECHNIQUE.
Final development rept.
17 May 62, 7p.
(Contract NObs-5236)
Unclassified report

DESCRIPTORS: *Electronic equipment, *Packaged circuits, Production, Materials, Mechanical properties, Pressure.

A method of assembly of electronic components into subassemblies without the use of molecular bonds is reported. The system is based on the premise that initial pressure will compress all contacts beyond the elastic limit, the retaining pressure will be sufficient to take up some elasticity at all contacts for the range of operating and service conditions, and that the available retaining medium elongation will be larger than that of all contact combinations in order to compensate for all variations such as material flow, temperature, curing, aging or setting. (Author)

AD-287 778 Div. 8, 25
(TISTP/MS) OTS price $3.60

Martin-Marietta Corp., Baltimore, Md.
OPTIMUM APERTURE STUDY.
Quarterly rept. no. 2,
by H. B. McClung and H. Rosenblatt. Nov 62, 34p. (Rept. no. RM-229)
(Contract AF 30(602)2676, Proj. 4506)
(RADC TDR 62-458) Unclassified report

DESCRIPTORS: *Antennas, *Antenna radiation patterns, *Illumination, Configuration, Integral transforms, Integral equations, Distribution.

The applicability of the Wiener-Spencer theorem to antennas is studied. This theorem states that minimum standard deviation of the far field power pattern occurs when the illumination function corresponds to the lowest mode of vibration of a membrane stretched across the aperture opening. This Quarterly Report presents the analytical solutions of optimum illumination distribution for two selected antenna aperture configurations, namely, polygonal and elliptical. The respective expressions for far-field power diffraction pattern, the zeroth and second moments, are also presented. (Author)

AD-287 800 Div. 8, 7
(TISTM/ODN) OTS price $2.60

Army Electronics Research and Development Lab., Fort Monmouth, N. J.
CRYSTAL FILTER TEST SET,
by Desiderio Schwab. Nov 61, 31p. incl. illus. tables (ASRDL technical rept. no. 2267)
Unclassified report

DESCRIPTORS: *Crystal filters, *High frequency filters, Test equipment, Frequency, Radiofrequency amplifiers, Impedance matching,

Amplifiers, Voltage, Test methods, High frequency, Radiofrequency transformers, Instrumentation.

A crystal filter test set capable of testing crystal filters in the 4.5- to 200-mc frequency range is described. The test set is housed in a metal cabinet and contains two tuned wide-band rf amplifiers, a built-in image impedance matching system, and an untuned wide-band (100 kc to 55 mc) compressed gain amplifier. The output of the compressed gain amplifier is a dc voltage proportional to the ac input voltage and compression rate. Compression rate is logarithmic within certain limits. The necessary additional instrumentation is briefly described and testing techniques are outlined. (Author)

AD-287 829 Div. 8, 25
(TISTP/TL) OTS price $2.60

Syracuse U. Research Inst., N. Y.
APPLICATION OF MODIFIED ZERNIKE POLYNOMIALS TO THE ANALYSIS OF FRESNEL REGION FIELDS OF CIRCULAR APERTURES WITH NON-UNIFORM AND NON-SYMMETRIC ILLUMINATION,
by Ming-kuei Hu. 15 Sep 62, 26p. incl. illus. table (Task rept. no. 2; Rept. no. EE 957-6209T2)
(Contract AF 30(602)2646, Proj. 4506)
(RADC TDR 62-469) Unclassified report

DESCRIPTORS: *Polynomials, *Microwaves, *Antennas, *Electric fields, *Illumination, Diffraction, Functions, Polarization, Conical antennas, Taylor's series, Integrals, Partial differential equations, Theory.

A modified form of Zernike polynomials and a set of generalized functions are introduced. These polynomials and functions are applied to the analysis of the Fresnel-region field of circular apertures with non-uniform and non-symmetric illumination. With m = 0, the general result reduces to that for non-uniform but circularly symmetric illumination obtained previously. A general expression for the far field (Fraunhofer field) of circular apertures with general illumination is also derived. Finally, a simple example is given as an illustration. (Author)

AD-287 830 Div. 8, 14
(TISTM/TCG) OTS price $3.60

Electronic Systems Lab., Mass. Inst. of Tech., Cambridge.
ELECTRON GUN FOR EVAPORATION OF OXIDE FILM,
by Paul J. Tallerico. June 62, 33p. incl. illus. 11 refs. (Rept. no. ESL-TM-141)
(Contracts AF 33(657)7644 and AF 33(616)7700)
Unclassified report

DESCRIPTORS: *Electron guns, *Electron beams, *Evaporation, *Refractory materials, *Films, Design, Space charges, Power, Density, Electrodes, Aluminum compounds, Oxides, Theory, Thermal radiation, Velocity, Ceramic materials, Physical properties.

The design and development of 2 types of electron beam sources for evaporation of refractory oxides is described. The first gun, having a hemispherical shape, was expected to have geometrical advantages making it useful for vacuum evaporation applications. However, the electrode configuration required to achieve high current efficiency proved to be an impractical structure. A Pierce gun was developed which is capable of providing a power density of 3 kw/sq cm in a spot size of several sq mm. This concentration of power is adequate to evaporate alumina. A theoretical study presented in the appendix describes the maximization of power density in a Pierce gun where the optimum geometry is determined by both thermal velocity and space charge effects. (Author)

AD-287 832 Div. 8
(TISTP/MS) OTS price $4.60

Office of Research Administration, U. of Michigan, Ann Arbor.
STUDY AND INVESTIGATION OF A UHF-VHF ANTENNA.
Quarterly progress rept. no. 9, 1 Apr-1 July 62, by A. T. Adams and R. M. Kalafus. July 62, 45p. incl. illus. tables, 10 refs. (Rept. no. 3667-9-P)
(Contract AF 33(616)7180)
Unclassified report

DESCRIPTORS: *Antennas, *Biconical antennas, *Loop antennas, *Slot antennas, *Helical antennas, Ultra high frequency, Very high frequency, Wave transmission, Waveguides, Antenna horns, Diffraction, Spheres, Cylindrical bodies, Impedance, Standing wave ratios, Measurement, Ferrites, Theory.

A theoretical analysis of the efficiency of a ferrite loaded biconical antenna is presented. A computer program to evaluate the efficiency is currently under preparation. The problems of mode conversion are discussed in relation to electrically small antennas. An intuitive approach using spherical transmission line theory is used to indicate qualitatively some of the difficulties associated with impedance matching for small antennas. The formulation of a variational expression for the admittance of an isotropic ferrite loaded rectangular waveguide opening out into an infinite ground plane is presented, along with the first part of the approximation procedure. A computer program is presently being prepared to carry out the first order approximation. Experimental data on the radiation patterns of ferrite loaded ridged cavity slot antennas and spiral antennas are presented. (Author)

AD-287 856 Div. 8
(TISTP/TL) OTS price $2.60

Bomac Labs., Inc., Beverly, Mass.
BL-221 70 Gc MAGNETRON PRODUCTION ENGINEERING MEASURE.
Quarterly progress rept. no. 3, 6 Feb-6 May 62, by Gary G. Riska. 6 May 62, 26p. incl. illus. tables.
(Contract DA 36-039-sc-85974)
Unclassified report

DESCRIPTORS: *Power amplifiers, *Magnetrons, *Production, *Engineering, Design, Ceramic materials, Sapphires, Vacuum pumps, Ions.

Minor constructional modifications in the present BL-221 magnetron design were investigated. Facilities capable of producing at a rate of 50 tubes per month are contemplated. Among the constructional modifications to be undertaken are: (a) Construction and evaluation of a BL-221 tube with a permanently attached Vac-Ion Pump, and (b) replacement of present glass window assembly with a ceramic or sapphire output structure. Four model tubes incorporating the modifications adopted are to be delivered to the Signal Corps for evaluation purposes and 30 additional tubes are to be manufactured for delivery after approval by the contracting agency. (Author)

AD-287 866 Div. 8
(TISTP/WH) OTS price $4.60

Westinghouse Electric Corp., Baltimore, Md.
STUDY OF FABRICATION OF MICROELECTRONIC AS-

SEMBLIES FOR FREQUENCY AND TIME CONTROL SYSTEMS.
Interim development rept. no. 1, 19 June-28 Sep 62.
26 Oct 62, 42p. incl. illus. tables.
(Contract NObsr-87593)
Unclassified report

DESCRIPTORS: *Subminiature electronic equipment, *Circuits, *Frequency dividers, *Digital systems, *Timing circuits, *Transistors, *Diodes.

The purpose of this study is to design a family of micro-electronic building blocks which can be used in time and frequency control systems. A table of micro-electronic components was assembled. A frequency counter system was analyzed and information about its characteristics was readily available. Study has resulted in a modified system and the analysis of the counter gave insight into the circuit problems that will be encountered in the other systems. A comprehensive survey and comparison of frequency dividers was made. Both digital and regenerative dividers are suitable for the systems considered. The digital divider is preferred because of its modular configuration, complete freedom from adjustments, and tolerance to parameter variations. A survey of frequency mixing circuits shows that both the transistor and varactor mixers are suitable for this application. Principle problems with mixers are gain, noise and spurious frequency signals. A diode mixer, which is typical of all mixers, has been analyzed in considerable detail. Design charts showing location and intensity of spurious frequencies are presented. (Author)

AD-287 870 Div. 8
(TISTE/CAM) OTS price $4.60

ARINC Research Corp., Washington, D. C.
RELIABILITY OF SEMICONDUCTOR DEVICES.
Quarterly rept. no. 1, 1 July-30 Sep 62,
by George J. Blakemore. 31 Oct 62, 49p. incl. illus. tables (Pub. no. 239-1-325)
(Contract NObsr-87664)
Unclassified report

DESCRIPTORS: *Semiconductors, *Reliability, Test methods, Life expectancy, Storage, Analysis, Measurements, Experimental data, Electrical properties, Probability, Statistical analysis, Theory, Numerical methods and procedures.

Life-test data on 13 of the 23 specified semiconductor device types were obtained. Analysis of one of these types was completed, and the results are included. Collection of field reliability data on transistors and transistorized equipment has started. Computer programming was completed for the Monte Carlo technique that is being used for placing confidence bands around the Weibull shape parameter. Analysis of the computer output was begun, and preliminary results are reported. The analysis consists of 4 parts: (1) distribution of electrical parameter readings at different time periods; (2) distribution of the change in electrical parameter readings at 1000 hours relative to the initial readings (delta distributions); (3) graphical estimation of the Weibull distribution shape parameter and scale parameter; and (4) determination of hazard rates based on the estimated Weibull parameters. (Author)

AD-287 875 Div. 8, 15
(TISTP/TL) OTS price $4.60

Case Inst. of Tech., Cleveland, Ohio.
RANK AND DEGREE REDUCTION IN RECIPROCAL n-PORT NETWORK SYNTHESIS,
by Roy D. Joseph. 1 May 62, 35p. incl. illus. 11 refs. (Scientific rept. no. 32)
(Contract AF 19(604)3887, Proj. 5635)
(AFCRL 62-321) Unclassified report

DESCRIPTORS: *Electrical networks, *Synthesis, *Matrix algebra, Series, Transformers.

Two methods of reducing the rank of an even part matrix were presented. The first reduces the rank only; the second offers the additional feature of degree reduction. The method with only rank reduction was generalized for any n-port network. This allows ultimate synthesis by the methods of Gewertz, Bayard, and Oono thus establishing a general synthesis procedure. Although it does establish a realization technique, difficulty is encountered in the excess components and tedious calculations required. These calculations occur when the immittance must be determined from the even part of the immittance function. The higher the degree of the matrix the more involved these calculations become. The method incorporating degree reduction lessens both of these difficulties. Significantly fewer components are necessary for the synthesis, and the calculations required are much easier to carry out. In this analysis the even part splits with degree reduction were obtained for the 2- and 3-port networks. It is felt that this material forms a foundation upon which an n-port decomposition will be based. (Author)

9. FLUID MECHANICS

AD-286 905 Div. 9, 25
(TISTM/EJH) OTS price $7.60

Weidlinger, Paul, New York.
FORCED VIBRATIONS OF AN ELASTIC CIRCULAR CYLINDRICAL BODY OF FINITE LENGTH SUBMERGED IN AN ACOUSTIC FLUID,
by Melvin L. Baron, Alva T. Matthews and Hans H. Bleich. June 62, 69p. incl. illus. (Technical rept. no. 1)
(Contract Nonr-345400, Proj. NR 064-464)
Unclassified report

DESCRIPTORS: *Cylindrical bodies, *Vibration, *Jet acoustic oscillations, Fluids, Boundary layer, Surfaces, Stresses, Elasticity, Mathematical analysis, Algebra, Integral equations, Simultaneous equations.

The first part of a study on the development of methods for treating the forced vibrations of elastic bodies of revolution submerged in an acoustic fluid is described. Specifically, the pressure and velocity fields which are produced in the fluid by the harmonic excitation of an elastic circular cylindrical body of finite length, are evaluated; the elastic cylinder is solid. A potential theory approach is used. The stresses and velocities in an elastic cylinder of finite length can be expressed in terms of 3 potential functions, each of which satisfies the wave equation. Similarly, the corresponding quantitites in the fluid can be expressed in terms of a single fluid potential which also satisfies the wave equation. Consequently, each of the 4 potential functions can be considered to be caused by a group of sources of unknown strength distributed over the boundaries of the elastic body and the fluid surface. Using essentially a finite difference approach, the boundaries of both the cylindrical body and the fluid are divided into a series of bands on which each of the unknown source strengths is

considered to be constant over the band. Conditions on the stresses and velocities at the fluid-elastic body interface lead to a system of simultaneous linear algebraic equations on the source strengths. (Author)

AD-286 971 Div. 9, 1
(TISTA/GEC) OTS price $2.60

Bureau d'Analyse et de Recherche Appliquees (France).
THEORETICAL ANALYSIS OF AIR FLOWS AROUND WINGS LOCATED IN THE VICINITY OF THE GROUND. I. GROUND EFFECT ON THE CLARK Y 10 PROFILE. II. GROUND EFFECT ON A FINITE SPAN WING.
Final rept., 1 Mar-30 May 62.
30 May 62, 21p. incl. illus.
(Contract DA 91-591-EUC-1758)
Unclassified report

DESCRIPTORS: *Wings, Ground effect, Theory, Model tests, Wind tunnel models, Aerodynamics, Aerodynamic data, Perturbation theory, Aerodynamic configurations, Gas flow.

The principle of the rheoelectrical analog method for the study of the ground effect on wing profiles was studied. Experiment has shown that the simulation of the stream function psi (x,y) is particularly appropriate if one limits oneself to the research of the lifting variation of the profile as a function of its altitude. Flow around the Clark Y 10 flapped profile located near the ground was studied. The flow around a wing located near the ground, of rectangular shape, and the aspect ratio of which is 2, was studied, taking into account the assumptions of the small perturbation linear theory. (Author)

AD-287 425 Div. 9
(TISTA/SEB) OTS price $2.60

Brown U., Providence, R. I.
UNIFORMLY VALID SECOND-ORDER SOLUTION FOR SUPERSONIC FLOW OVER CRUCIFORM SURFACES,
by James Wallace, Jr. and Joseph H. Clarke.
June 62, 24p. illus. 6 refs. (Rept. no. CM-1019)
(Subcontract to Solid Propellant Information Agency, Applied Physics Lab., Johns Hopkins U., Silver Spring, Md., Contract NOw 62-0604-c)
Unclassified report

DESCRIPTORS: *Supersonic flow, *Cruciform wings, Wing-body configuration, Fins, Wing inlets, Turbojet inlets, Jet engine inlets, Duct inlets, Aerodynamic configurations, Vortices, Equations, Theory, Mathematical analysis.

Second-order supersonic flow over a cruciform configuration is studied for supersonic inlets, wing-body junctions and vehicle fins. Severe local failures are identified and adjusted for the ordinary second-order theory. For wings with discontinuous slopes, discontinuous potentials occur across the planar shock and square-root singularities in the velocities occur at the intersection of these shocks with the cruciform surfaces. A second-order solution uniformly valid to first order is constructed by adjustment of the ordinary second-order solution obtained first. The uniformly valid solution has two different series representations in the thickness parameter. This solution gives the detailed wave structure and shows a flow regime upstream of the vertex-centered undisturbed Mach cone not predicted by the ordinary theory. The wave structure consists of a pyramidal arrangement of planar shocks adjacent to and upstream of the above cone, followed by weaker oblique expansion fans and finally by two extremely weak shocks coincident with the vertex-centered undisturbed Mach cone. Results are given for the case of two intersecting wedges. (Author)

AD-287 452 Div. 9
(TISTA/SEB) OTS price $1.00

Litton Systems, Inc., Woodland Hills, Calif.
A PRELIMINARY INVESTIGATION OF THE EFFECTS OF VARIATIONS IN REYNOLDS NUMBER AND SURFACE TEMPERATURE ON FOUR SURFACE PRESSURES ON A SLIGHTLY BLUNTED 7-1/2 DEGREE HALF-ANGLE CONE AT MACH NUMBERS 5 AND 8 FOR ANGLES OF ATTACK UP TO 24 DEGREES.
Final rept.,
by Fred O. Smetana. Aug 62, 28p. incl. illus. tables.
(Contract AF 33(657)7715, Proj. 8222)
(ASD TDR 62-360) Unclassified report

DESCRIPTORS: *Conical bodies, Aerodynamics, Blunt bodies, Temperature, Pressure, Boundary layer, Model tests, Wind tunnel models, Surface properties, Surface temperatures, Hypersonics.

The effects of variations in Reynolds Number and surface temperatures on 4 surface pressures were studied with a slightly blunted 7 1/2 degree half-angle cone at Mach Numbers of 5 and 8 for angles of attack up to 24 degrees. The variation of cone pressure with angle of attack followed the expected sine squared distribution and the beta plane pressure changes with angle of attack (alpha) could be predicted from the characteristics of a cylinder normal to a stream of Mach Number M sin alpha. Although the cone was insensitive to changes in Mach Number in the investigated Mach Number range for constant Reynolds Number, a reduction in free stream Reynolds Number by an order of magnitude appeared to reduce the angle of attack sensitivity by about 10%. For the range of Mach Numbers tested, the displacement of the free stream by the boundary layer was small amounting to a maximum of 1/2 degree increase in effective cone angle for M = 8 and Re/ft = 300,000 and insignificant increases for the lower Mach Number and higher Reynolds Numbers. For the Reynolds Numbers investigated, the effect of wall temperature was also found to be small. (Author)

AD-287 464 Div. 9, 25
(TISTP/JW) OTS price $1.60

Michigan State U., East Lansing.
THEORY OF ELECTRON CONDUCTION IN STRONG MAGNETIC FIELDS AT LOW TEMPERATURES,
by Ki-ichi Nakamura. Oct 62, 14p. incl. illus. 8 refs.
(Contract AF 49(638)70)
Unclassified report

DESCRIPTORS: *Electrons, *Conductivity, Low temperature research, Magnetic fields, Metals, Transport properties, Phonons, Drag.

An approach for the study of electron conduction in strong magnetic fields is developed and the thermopowers of metals are calculated. The final results will be obtained in the near future. It is expected that in transverse conduction the dependence of thermopower upon magnetic field will be significantly changed by the presence of phonon drag. On the other hand, the effect of phonon drag in longitudinal conduction will be smaller, compared with that in transverse conduction. (Author)

AD-287 468 Div. 9, 25
(TISTP/JW) OTS price $2.60

Polytechnic Inst. of Brooklyn, N. Y.
LINEARIZED DIFFUSION IN A RELAXING CONVECTING GAS WITH PRANDTL AND LEWIS NUMBER EFFECTS,
by Pasquale M. Sforza. Sep 62, 22p. incl. illus.
(PIBAL rept. no. 725)
(Contract AF 49(638)445, Proj. 9781)
Unclassified report

DESCRIPTORS: *Gases, *Relaxation time, Velocity, Fluid flow, Viscosity, Temperature, Density, Convection.

The linearized model of an ideal gas with diffusion processes and rate reaction is applied to one-dimensional unsteady motion generated by initial non-uniformities of state and velocity. The time-dependent system resembles that of steady, two-dimensional, free mixing of jet or wake type. The temporal and spatial character of the profiles of flow variables is studied analytically for the conditions of state and velocity non-uniformities with various combinations of Lewis and Prandtl numbers. This model corresponds to a two-dimensional viscous free mixing flow of an ideal dissociating gas with state variations of temperature and concentration. (Author)

AD-287 487 Div. 9
(TISTA/GEC) OTS price $4.60

David Taylor Model Basin, Washington, D. C.
CAVITY TURBULENCE TESTS USING A 0.0646-SCALE MODEL R5D-2 AIRPLANE,
by Richard D. Murphy and William F. Rosenik.
Sep 62, 40p. incl. illus. tables, 2 refs.
(AERO rept. no. 1017)
Unclassified report

DESCRIPTORS: *Transport planes, Wind tunnel models, Fuselages, Turbulence, Turbulent flow, Deflection, Design, Measurement, Aerodynamics, Aerodynamic data, Drag, Pressure, Guide vanes, Aerodynamic configuration, Cavitation, Model tests.

A wind-tunnel test program was conducted to determine the configuration of a flow deflector for a cavity in the fuselage of an R5D-2 airplane. It was anticipated that airflow and turbulence in the cavity would create an objectionable condition for an unshielded device to be installed in the cavity. No index of tolerable turbulence level can be specified prior to actual evaluation of the device and measurement of the turbulence level. A deflector system was recommended to the Naval Research Laboratory, and drawings were forwarded for modification of the aircraft configuration. A performance evaluation of the modified aircraft and of the deflector system prior to installation of the equipment was also recommended. (Author)

AD-287 625 Div. 9
(TISTP/WH) OTS price $1.60

Brown U. Div. of Applied Mathematics, Providence, R. I.
ON THE STABILITY OF VISCOUS FLOW BETWEEN ROTATING CYLINDERS. II. NUMERICAL ANALYSIS,
by D. L. Harris and W. H. Reid. Oct 62, 18p. incl. illus. table, 4 refs. (Technical rept. no. 43)
(Contract Nonr-562(07); Proj. NR-062-179)
Unclassified report

DESCRIPTORS: *Fluid flow, *Viscosity, *Numerical analysis, *Integral equations, Matrix algebra, Rotating structures.

A simple numerical method is presented for solving the eigenvalue problem which governs the stability of Couette flow. The method is particularly useful in obtaining the eigenfunctions associated with the various modes of instability. When the cylinders rotate in opposite directions, these eigenfunctions exhibit an exponentially damped oscillatory behavior for sufficiently large values of -mu, where mu = omega 2/omega 1. In terms of the stream function which describes the motion in planes through the axis of the cylinders, this means that weak, viscously driven cells appear in the outer layers of the fluid which, on Rayleigh's criterion, are dynamically stable. For mu = -3, for example, 4 cells are present, the amplitudes of which are in the ratios 1.0: 0.172: 0.013: 0.00125. (Author)

AD-287 667 Div. 9
(TISTM/TCG) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE EFFICIENCY OF A CROSS-RIBBED CURVILINEAR DIFFUSER,
by V. K. Migay. 11 Sep 62, 5p. incl. illus. 2 refs. (Trans. no. FTD-TT-62-1151 from Energomashinostroyeniye No. 1, pp. 45-46, 1962)
Unclassified report

DESCRIPTORS: *Cylindrical bodies, *Curved profiles, *Diffusers, Laminar boundary layer, Turbulent flow, Turbulence, Effectiveness, Reynolds number.

Tests conducted to increase the efficiency of diffusers indicated that cross-ribbing installed on the walls of curvilinear diffusers leads to an increase in their efficiency. The efficiency of a ribbed diffuser significantly depends upon the arrangement of the ribs in the flow section. (Author)

AD-287 673 Div. 9
(TISTP/JW) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
A METHOD FOR MATHEMATICAL SIMULATION OF SPACE EDDY HYDRODYNAMIC FIELDS,
by I. M. Tetel'baum and Yu. M. Bayakovskiy.
10 Oct 62, 4p. incl. illus. (Trans. no. FTD-TT-62-647 from Soviet Patent 137277 (677140/26) 23 Aug 60)
Unclassified report

DESCRIPTORS: *Hydrodynamics, *Magnetic fields, Compressible flow, Boundary layer, Mathematical analysis, Translations, Fluid flow, Simulation.

AD-287 679 Div. 9
(TISTP/LMH) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
DISTRIBUTION OF TEMPERATURE IN A HOLLOW INFINITE CYLINDER,
by B. I. Kogan and A. F. Khrustalev. 8 Oct 62, 6p. (Trans. no. FTD-TT-62-1392 from Tezisy Dokladov I Soobshcheniy Na Soveshchanii Po Teplo I Massobmenu, pp. 1-8, 5-9 June 61)
Unclassified report

DESCRIPTORS: *Heat transfer, *Boundary layer, Temperature, Functional analysis, Cylindrical bodies, USSR.

AD-287 688 Div. 9, 25
(TISTP/JW) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
SIMPLEST PROBLEMS INVOLVING A GAS-IONIZING SHOCK WAVE IN AN ELECTROMAGNETIC FIELD,
by A. G. Kulikovskiy and G. A. Lyubimov.
9 Oct 62, 7p. 3 refs. (Trans. no. FTD-TT-62-1219 from Doklady Akademii Nauk SSSR 129:3, pp. 525-528, 1959)
Unclassified report

DESCRIPTORS: *Ionization, *Shock waves, Electromagnetic fields, Gases, Propagation, Conductors, Viscosity, Dynamics, Translations.

Division 9 - FLUID MECHANICS

AD-287 698 Div. 9
(TISTP/JW) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
HEAT TRANSFER OF WAVE STRIPS IN A LONGITUDINAL AIR STREAM,
by O. O. Kremnev and M. T. Dukhnenko. 21 Sep 62, 5p. incl. illus. 3 refs. (Trans. no. FTD-TT-62-971 from Akademiya Nauk UkrRSR, Dopovidi No. 11, pp. 1495-1497, 1961)
Unclassified report

DESCRIPTORS: *Heat transfer, *Air mass analysis, Fluid flow, Translations, Wave characteristics, Boundary layer.

AD-287 700 Div. 9, 25
(TISTP/JW) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
A METHOD FOR CONSTRUCTING AN AUTOMATIC CONTROL SYSTEM WHOSE TRANSIENT IS CLOSE TO OPTIMAL,
by A. V. Rozanov and V. I. Kukhtenko. 25 Sep 62, 9p. incl. illus. 1 ref. (Trans. no. FTD-TT-62-973 from Samoletnoye Elektrooborudovaniye, Oborongiz, pp. 63-69, 1960)
Unclassified report

DESCRIPTORS: *Control systems, *Nonlinear systems, Signals, Perturbation theory, Automatic, Circuits, Dynamics, Translations, USSR.

AD-287 701 Div. 9, 25
(TISTP/JW) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
EXPERIMENTAL INVESTIGATION OF THE FLOW OF A VAPORIZED LIQUID FILM ALONG THE SURFACE OF A CONE BLOWN BY GAS,
by V. N. Polyayev. 19 Sep 62, 14p. incl. illus. 2 refs. (Trans. no. FTD-TT-62-1031 from Izvestiya uysshikh uchebnykh zavedeniye, Mashinostroyeniye No. 5, pp. 140-148, 1960)
Unclassified report

DESCRIPTORS: *Fluid flow, *Vaporization, Surfaces, Gases, Liquids, Films, Translations, Velocity.

A method for protecting a hot wall by creating a liquid film on its surface is described and results are cited of an experiment concerning the flow of a liquid film along a smooth surface of a cone, past which flows a high temperature gas. Recommendations will be given for an undetached flow of a liquid (water) along the cone surface. A formula is obtained for determining the initial flow velocity of a liquid film (water) realtive to the velocity of the free-stream flow. (Author)

AD-287 708 Div. 9
(TISTP/TL) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE FLOW OF A SUPERSONIC IDEAL GAS PAST A FLAT PLATE IN THE PRESENCE OF VOLUME HEAT RELEASE,
by I. F. Shanknov and V. A. Frost. 19 Sep 62, 18p. incl. illus. 7 refs. (Trans. no. FTD-TT-62-1049 from Trudy Moskovskogo Fiziko-Tekhnicheskogo Instituta, Issledovaniya po Mekhanike i Prikladnoy Matematike, No. 7, pp. 110-123, 1961)
Unclassified report

DESCRIPTORS: *Gases, *Supersonic flow, *Heat transfer, *Sheets, Pressure, Compression shock, Density, Thermodynamics, Dynamics.

The classical method of characteristics and the method of linearization of equations are altered in order to calculate the supersonic flow of an ideal gas in the presence of volume heat transfer. A comparison is presented of the results of calculation by both methods for the case of flow past a flat wall when the heat is supplied to the stream in a rectangular zone. (Author)

AD-287 759 Div. 9
(TISTM/ODN) OTS price $1.60

Naval Boiler and Turbine Lab., Philadelphia, Pa.
FLOW METER CALIBRATIONS FOR THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS RESEARCH COMMITTEE ON FLUID METERS,
Research and Development rept. for 31 Oct 62, by C. Gregory. 31 Oct 62, 11p. incl. illus. tables.
Unclassified report

DESCRIPTORS: *Orifices, *Nozzles, Reynolds number, Calibration, Water, Hydrodynamics, High pressure research, High temperature research, Alloys, Stainless steel, Steel, Chromium alloys, Molybdenum alloys, Corrosion, Tests, Steam, Flowmeters, Fluid flow, Fluid mechanics, Materials, Hydrostatic pressure.

Six nozzles and 2 orifices were calibrated in pairs, one of a pair with water (240 F, 2200 psia) at the inlet and the other with steam (1050 F, 2000 psia) at the outlet of an operating boiler. Pipe Reynolds numbers averaged 600,000 for the water and 4,000,000 for the steam. Coefficients were generally in agreement with ASME. Type 430 stainless steel proved a better material of construction for the steam conditions than 2-1/4% chrome-molybdenum steel. The latter material showed considerable rusting and pitting after less than 10 hours of operation. (Author)

AD-287 793 Div. 9, 25
(TISTM/EJH) OTS price $6.60

Atlantic Research Corp., Alexandria, Va.
TURBULENT FLAME STUDIES IN TWO DIMENSIONAL OPEN BURNERS,
Final rept.,
by J. H. Grover and E. N. Fales. 30 June 60, 24p. illus. tables, 10 refs.
(Contract AF 49(638)510, Proj. 9751)
(AFOSR TR 60-94) Unclassified report

DESCRIPTORS: *Flames, *Flame propagation, *Turbulence, *Turbulent flow, Air, Fuels, Mixtures, Velocity, Test methods, High speed photography, Gases.

Investigation verified the concept that the effect of turbulence on flames is only to wrinkle and extend the surface of the flame front. Flash-tube photographs show the instantaneous flame front to be a thin wrinkled continuous boundary between unburned and burned gases. All experimental measurements and the propagation of wrinkles in the high-speed motion picture substantiate this. Results definitely indicate that the ratio of local turbulent flame velocity to the laminar flame velocity, can be correlated with a dimensionless time parameter, and the dimensionless turbulence intensity in the approach flow. A useful technique was developed and verified for determination for a turbulent flame of the mean flow field in the neighborhood of the flame, the mean flame front, the root-mean-square displacement of the mean flame front, the local turbulent flame velocity, and the position of the instantaneous flame front. A technique was developed for following the formation and growth of wrinkles in the instantaneous flame front. (Author)

AD-287 808 Div. 9
(TISTW/RD) OTS price $3.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
PARTICLE-SOLID IMPACT PHENOMENA,
by C. D. Liles and E. H. Goodman. Nov 62, 27p. incl. illus. tables, 6 refs. (Rept. no. AEDC TDR 62-202)
(Contract AF 40(600)1000)
Unclassified report

DESCRIPTORS: *Hypervelocity projectiles, Projectiles, Penetration, Cratering, Aluminum, Hypersonic flow, Sabot projectiles, Copper, Terminal ballistics, Physical properties, Impact shock.

High velocity impact tests were made with high purity aluminum and copper projectiles and targets. Data are presented for impact velocities from 0.762 to 7.62 km/sec, and these are compared with various correlation formulas. (Author)

10. FUELS AND COMBUSTION

AD-286 904 Div. 10
(TISTW/RD) OTS price $9.10

James Forrestal Research Center, Princeton, N. J.
A COOPERATIVE PROGRAM OF FUNDAMENTAL RESEARCH AS RELATED TO JET PROPULSION FOR THE OFFICE OF NAVAL RESEARCH, DEPARTMENT OF THE NAVY.
Semi-annual progress rept., 1 Apr-30 Sep 62. 1 Oct 62, 102p. incl. illus. tables, refs.
(Contract Nonr-185825, Proj. NR-098-038, Proj. Squid)
Unclassified report

DESCRIPTORS: *Combustion, *Jet propulsion, Kinetic theory, Magnetohydrodynamics, Solid rocket propellants, Gas ionization, Fluid flow, Turbulence, Thermal conductivity, Plasma jets, High temperature research, Jet flames, Jet engine fuels.

Contents:
Fluid mechanics
Transport and transfer processes
Chemical kinetics
Combustion phenomena

AD-287 591 Div. 10
(TISTM/TCG) OTS price $2.60

Catholic U. of America. School of Engineering and Architecture, Washington, D. C.
NEW METHOD TO DETERMINE RESTRAINED SHRINKAGE STRESSES IN PROPELLANT GRAIN MODELS.
Interim rept. no. 2 on Development of Experimental Stress Analysis Methods to Determine Stresses and Strains in Solid Propellant Grains, by A. J. Durelli and V. J. Parks. Oct 62, 13p. incl. illus. 2 refs.
(Contract Nonr-224906)
Unclassified report

DESCRIPTORS: *Solid rocket propellants, *Propellant grains, *Stresses, Test methods, Photoelasticity, Bonding, Rocket cases, Polymers, Urethanes, Synthetic rubber, Vulcanization, Casting, Epoxides, Mechanical properties.

Photoelastic determination of restrained shrinkage stresses which may be produced by curing or by thermal effects in models of solid propellant grains bonded to the case is considered. Use is made of the bi-refringence exhibited in the curing process of a restrained polyurethane rubber. The techniques developed to take advantage of this property are shown in detail. The method can also be applied to the determination of the residual stresses produced in the curing process of a propellant cast around a rigid insert. An example of this application is also given. The extension of the method, using epoxies, to 3-dimensional analyses is pointed out. (Author)

AD-287 666 Div. 10
(TISTP/LMH) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
INVESTIGATING FLOW AND HEAT TRANSFER OF A RAREFIED GAS IN A FLAT SUPERSONIC NOZZLE,
by S. I. Kosterin, Yu. A. Koshmarov and Yu. V. Osipov. 5 Oct 62, 11p. incl. illus. refs.
(Trans. no. FTD-TT-62-1279 from Inzhenerno-Fizicheskiy Zhurnal No. 4, pp. 3-9, 1962)
Unclassified report

DESCRIPTORS: *Supersonic nozzles, *Supersonic flow, Gas flow, Heat transfer, Pressure, Measurement, USSR.

AD-287 680 Div. 10
(TISTM/ODN) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
REGULARITIES OBSERVED IN MIXTURES OF LIQUID FUEL DURING IGNITION,
by V. I. Blinov. 11 Sep 62, 6p. incl. illus.
(Trans. no. FTD-TT-62-1037 from Inzhenerno-Fizicheskiy Zhurnal 4:2, pp. 95-98, 1961)
Unclassified report

DESCRIPTORS: *Fuels, *Combustion, Mixtures, Ignition, Ethanols, Benzenes, Toluenes, Acetones, Mathematical analysis, USSR, Thermodynamics, Liquids.

The dependence of the ignition temperature on composition of mixtures of C_2H_5OH and C_6H_6 was determined. A minimum is observed at a mole fraction ratio of about 0.75 to 0.25. Dependence of the ignition limit on the composition of various mixtures of C_6H_6, $C_6H_5CH_3$, C_2H_5OH, and CH_3OCH_3 was also determined. An empirical equation was derived for calculation of the ignition limit.

11. GROUND TRANSPORTATION EQUIPMENT

AD-287 409 Div. 11
(TISTE/CAM) OTS price $3.60

Army Transportation Board, Fort Eustis, Va.
KIT, OFF-ROAD CONVERSION, M52-127 TRUCK TRACTOR SEMITRAILER COMBINATION.
Final rept. of evaluation.
Oct 62, 37p. incl. illus. (Rept. no. TCB-61-044-0E)
Unclassified report

DESCRIPTORS: *Cargo vehicles, *Trailers, *Tractors, Desert tests, Tires, Installation, Operation.

The off-road conversion kit consists of a set of component items which allow application of 14.75x20 tube type, nondirectional, military

desert tires to the M52 truck tractor and M127 semitrailer combination in order to improve off-road mobility. These vehicles are rated to carry 18 tons on road and 12 tons off road, and are normally equipped with 11.00x20 tube type, non-directional, military cross country tires. Tandem wheels are dual (14.00x20 military cross country tires can also be used with the kit). (Author)

12. GUIDED MISSILES

AD-286 912 Div. 12, 23, 26, 27
(TISTB/AW) OTS price $5.60

Rocketdyne, Canoga Park, Calif.
MISSILE ASSEMBLY AND MAINTENANCE, LOGICAL FUNCTION REPORT ON OSTF-1 HUMAN FACTORS-PERSONNEL SUBSYSTEM TEST OBJECTIVES (ATLAS MA-3 PROPULSION SYSTEM),
by F. S. Hall and G. A. Peters. 15 Sep 62, 50p. incl. illus. table (Rept. no. R-3799)
(Contract AF 04(694)8)
Unclassified report

DESCRIPTORS: *Guided missiles (Strategic), *Guided missiles (Surface to surface), *Guided missile personnel, *Maintenance personnel, Human engineering, Identification, Analysis, Safety, Training, Selection, Standards, Rocket motors, Maintenance equipment, Tools, Ground support equipment, Maintenance.

Eighty-six incidents (Deviation/Difficulties) involving the Atlas MA-3 propulsion system were reported as part of an operational system test and evaluation program conducted at Vandenberg Air Force Base, California. Knowledge of these incidents was obtained by direct observation of missile assembly and maintenance shops preparation and missile checkout job operations. Fifty-five human factors problems were identified and analyzed in relation to safety, training, organizational controls, technical data, personnel selection and manning, and the design of engine hardware, aerospace ground equipment, maintenance shop facilities, and missile hardware. (Author)

AD-286 920 Div. 12, 6
(TISTW/RD) OTS price $5.60

Air Force Inst. of Tech., Wright-Patterson Air Force Base, Ohio.
THE EFFECT OF FREQUENCY TRACKING, THE USE OF A PHASE-LOCK LOOP, AND PREDICTED TRACKING ON RECEIVER SENSITIVITY,
Master's thesis,
by Emil G. Riedel, Jr. Aug 62, 48p. incl. illus. table, 8 refs. (Rept. no. GA/EE/62-2)
Unclassified report

DESCRIPTORS: *Satellite vehicles, *Radio receivers, *Doppler tracking, Signal-to-noise ratio, Automatic, Tracking, Sensitivity.

Frequency tracking, the phase-lock loop, and predicted tracking, when used to improve the effectiveness of radio receivers in the tracking of earth satellites are compared. The techniques are evaluated in terms of their effect on receiver sensitivity. Sensitivity is defined as the input signal power required to produce the output signal to noise ratio deemed necessary by the system designer for detection. The detection bandwidth for each technique is smaller than that of the conventional receiver. By using the smaller bandwidth, much extraneous noise is removed and the output signal to noise ratio is improved. A lower value of input signal power is required to produce the output signal to noise ratio and the sensitivity is increased. The detection bandwidths for frequency tracking and the phase-lock loop are nearly the same. Because of the lower threshold of the phase-lock loop, the receiver sensitivity is greater by two orders of magnitude than that of frequency tracking. Prediction tracking is a form of correlation detection which makes more effective use of the reduced detection bandwidth. When used in conjunction with the other two techniques, the sensitivity is increased by another order of magnitude. (Author)

AD-286 923 Div. 12
(TISTA/SEB) OTS price $10.10

Air Force Inst. of Tech., Wright-Patterson Air Force Base, Ohio.
ESCAPE TRAJECTORIES FOR LOW THRUST VEHICLES.
Master's thesis,
by John Joseph Dell. Aug 62, 117p. incl. illus. tables, 17 refs. (Rept. no. GA/Phys/62-4)
Unclassified report

DESCRIPTORS: *Flight paths, *Satellite vehicle trajectories, *Theses, Thrust, Satellite vehicles, Spaceships, Launching, Motion, Equations, Digital computers, Aviation safety, Gravity, Earth, Space flight.

The escape parameters (time, range angle and position) are studied for achieving optimum escape missions using low-thrust vehicles. Results are compared with previously reported analytical and numerical calculations. The equations of motion in addition to Euler-Lagrange optimization equations were solved using an IBM 7090 Low-Thrust Digital Computer Program. Specific impulses were varied from 1,000 to 25,000 sec and electrical power outputs were varied from 100 KW to 100 MW. Planar orbits (initially circular) were assumed. Results of the parametric investigation are presented both in tabular and graphical form. Analysis of generated escape data indicate that the analytical equations previously reported have deviations ranging from approximately -25% to 44%. Numerical results previously reported are in general agreement with this study. (Author)

AD-286 926 Div. 12, 25
(TISTA/SEB) OTS price $6.60

Air Force Inst. of Tech., Wright-Patterson Air Force Base, Ohio.
DESIGN ANALYSIS OF A PARTICLE THERMAL RADIATOR FOR SPACE VEHICLES,
Master's thesis,
by Duane Wenzel Smetana. Aug 62, 59p. incl. illus. tables, 14 refs. (Rept. no. GA/Phys/62-16)
Unclassified report

DESCRIPTORS: *Satellite vehicles, *Theses, Particles, Particle trajectories, Radiators, Reflection, Theory, Design, Heat transfer, Thermal radiation.

The design of a new type of thermal space radiator is extended. Micron-sized particles are heated and electrically charged on a high potential spherical electrode and ejected into space. A second high potential spherical electrode of opposite polarity attracts these particles and changes the polarity of their charge upon contact. The particles then return to the first electrode to complete the cycle. Along their trajectories the particles radiate thermal energy, giving a high area-to-mass ratio because of their small size. Equations are presented which permit calculation of power radiated-to-mass ratios for the entire system. Results of a computer study indicate that at power levels above one megawatt the new type of particle radiator

will weigh approximately four to eight percent of the weight of its conventional tube-and-header counterpart. Limitations of the theory are investigated and discussed. (Author)

AD-286 961 Div. 12, 30
(TISTM/TCG) OTS price $1.60

Naval Ordnance Test Station, China Lake, Calif.
DETECTION AND EVALUATION OF INTERFACE SEPARATIONS IN ROCKET MOTORS,
by J. I. Bujes, Aug 62, 14p. incl. illus. tables (NOTS TP 2931)
(NAVWEPS rept. no. 7917)
Unclassified report

DESCRIPTORS: *Rocket motors, *Combustion chamber liners, *Bonding, *Separation, Design, Surfaces, Bonded joints, Feasibility studies, Detection, X-ray absorption analysis, Radiography, Propellant grains, Non-destructive testing.

Computations based upon the geometry of a rocket motor and the x-ray absorption coefficients of the materials indicated the feasibility of detecting interface separations in rocket motors even when the radial dimension of the unbonded area is as small as 0.011 in. These conclusions were amply verified by experiments. Tangential radiography of interface areas in rocket motors thus provides a basis upon which to develop an in-process and end-product inspection. (Author)

AD-286 968 Div. 12
(TISTA/SEB) OTS price $5.60

Aeronutronic, Newport Beach, Calif.
ORBITAL INTERSECTION PROGRAM,
Technical report on Space Systems Operations,
by R. G. Schinnerer, May 62, 54p. incl. illus.
(Publication no. U-1701-R)
(Contract AF 19(604)7375)
(ESD TDR 62-286) Unclassified report

DESCRIPTORS: *Orbital flight paths, Satellite vehicle trajectories, Flight paths, Spaceships, Satellite vehicles, Mathematical analysis, Mathematical prediction, Computers, Theory, Digital computers, Interception.

The point in position-time space where two orbits intersect is studied for cases where one orbit is suspected of having originated from the other. Two modes of operation were provided. The primary mode consists of starting with two element sets and computing the intersection parameters. In the second mode, the input contains only one element set and the other element set is generated internally from the intersection parameters which are contained in the input. Thus the user can specify the time of the intersection, the velocity impulse, and the errors in position and time. This aids the experimenter by enabling him to know the correct results before using the program. After computing the second element set, this mode is identical to the primary mode. Two subsidiary methods of operation are provided to assist in the analysis of the relative motion between two satellites. The first is the calculation of an ephemeris in position and velocity for given sets of elements. Inspection of these ephemerides may yield the time of orbital intersection. The second method provides the capability, if the time of intersection is known accurately, perhaps from the above inspection, of bypassing the initial phases of the determination of time of intersection and entering directly into the final stages of computation. (Author)

AD-287 098 Div. 12, 14, 17, 10
(TISTM/EJH) OTS price $2.60

Bell Aerosystems Co., Buffalo, N. Y.
COMPILATION OF UNPUBLISHED MATERIALS INFORMATION. PHASE II. CURRENT MATERIALS RESEARCH AND DEVELOPMENT PROGRAMS IN EFFECT.
Semi-annual rept. no. 1.,
15 Oct 62, 16p. (Rept. no. 2084-933001)
(Contract AF 33(657)8555)
Unclassified report

DESCRIPTORS: *Guided missile research, *Refractory materials, *Liquid rocket propellants, Metals, Refractory coatings, Composite materials, Ceramic materials, Materials.

AD-287 103 Div. 12
(TISTA/SEB) OTS price $1.60

Aerospace Corp., Los Angeles, Calif.
ELECTRONICS PROGRAM. SATELLITE ATTITUDE CONTROL SYSTEM EXPERIMENTS.
Semiannual technical rept., 1 Jan-30 June 62,
by W. Tsusaki. 30 June 62, 11p. incl. illus.
3 refs. (Rept. no. TDR-69(2250-32)TR-2)
(Contract AF 04(695)69)
(DCAS TDR 62-189) Unclassified report

DESCRIPTORS: *Satellite attitude, Gases, Ejection, Air ejectors, Test equipment, Satellite vehicles, Simulation, Control systems.

A satellite attitude control system utilizing a digitally controlled gas jet scheme is being investigated. Design and development of special purpose test equipment and implementation of the attitude control system is reported. (Author)

AD-287 107 Div. 12, 6
(TISTW/RD) OTS price $6.60

Philco Corp., Palo Alto, Calif.
STUDY OF THE PHASE-LOCKED LOOP FOR DOPPLER TRACKING,
by J. P. Heckert. 15 May 62, 1v. incl. illus. table, 17 refs. (Rept. no. WDL-TR-1742)
(Contract AF 04(647)829)
Unclassified report

DESCRIPTORS: *Doppler tracking, *Satellite vehicles, Geometry, Satellite vehicle trajectories, Errors, Signal-to-noise ratio, Tracking, Mathematical analysis.

The basic design and use of the phase-locked receiver as a doppler tracking device are discussed. Conclusions, graphs, and tables are presented for determining such parameters as required transmitter power, minimum loop bandwidths required for tracking and for initial acquisition, memory times for automatic reacquisition of a lost signal, optimum sampling-time for doppler measurement, and errors in doppler frequency measurement. (Author)

AD-287 119 Div. 12, 6
(TISTW/PCR) OTS price $3.60

Naval Research Lab., Washington, D. C.
NRL SERVICES PROVIDED IN THE DEVELOPMENT OF TRI-SERVICE MISSILE RANGE RADAR INSTRUMENTATION,
by J. H. Dunn and D. D. Howard. 8 Oct 62, 27p. incl. illus. 16 refs. (NRL rept. no. 5845)
Unclassified report

DESCRIPTORS: *Guided missiles, *Instrumentation, *Radar equipment, *Guided missile tracking systems, Radar tracking, Servomechanisms, Digital systems, Naval procurement, Military procurement, Test facilities.

NRL was contracted by BuWeps to provide consul-

tive services to assure that the instrumentation radars, modification kits, and other radar development contracts are consistent with the state of the art and to coordinate Tri-Service specifications and evaluation. The initial tracking radars, the AN/FPS-16 and AN/MPS-25, and modification kits for incorporating new state-of-the-art techniques have maintained high reliability precision radar tracking closely approaching the basic precision limitations imposed by propagation effects. At present, NRL is providing similar consultive service on the AN/FPQ-6 and AN/TPQ-18 instrumentation radars. (Author)

AD-287 245 Div. 12
(TISTW/PCR) OTS price $3.60

Diamond Ordnance Fuze Labs., Washington, D. C.
FEASIBILITY STUDY. MISSILE TRAJECTORY MEASURING SYSTEM,
by James S. Shreve. 10 Oct 62, 43p. incl. illus.
(Rept. no. TR-1000)
(DOFL proj. 62261)
Unclassified report

DESCRIPTORS: *Guided missile trajectories, *Guided missile tracking systems, Specifications, Radar tracking, Radar pulses, Range, Ultra high frequency, Design, Tests, Errors, Radar stations, Time interval counters, Range finding, Radar antennas, Attenuation, Radar echo areas, Drawings, Drafting, Measurement.

A proposed missile tracking system that was investigated for use at missile test ranges in locating test vehicles in flight is described. This system utilizes pulsed-radar techniques. During operation, the system continually measures altitude above terrain from approximately 10,000 to 100 ft, and slant ranges to fixed ground stations up to 30 mi away. The resulting data are made available in real time--that is, information is presented as soon as the measurements are taken. The rf frequency specified is approximately 1 kmc; pulse rise times are on the order of 10 nsec. Design description, system operation, test data and analysis of components, and analysis of the over-all system are presented. The analysis shows that expected errors are on the order of ± 10 ft. (Author)

AD-287 271 Div. 12, 26
(TISTM/TCG) OTS price $1.60

Army Missile Command, Redstone Arsenal, Huntsville, Ala.
MOTOR CASE FABRICATION TECHNIQUES AND APPLICATIONS,
by D. C. Sayles. 18 Oct 62, 19p. incl. tables, 8 refs. (Rept. no. RK-TR-62-5)
Unclassified report

DESCRIPTORS: *Rocket cases, *Rocket motors, *Manufacturing methods, Steel, Titanium alloys, Glass textiles, Filament wound construction, Heat resistant alloys, Explosive forming, Metal forming presses, Welds, Resins, Bonding, Cryogenics, Solid rocket propellants, Production.

The purpose of this paper is to consider the present development status and outlook for solid propellant motor case fabrication techniques and applications within the United States. This review will include a consideration of all of the motor case development programs which are being conducted under the sponsorship of the Ordnance Materials Research Office and certain missile development programs. (Author)

AD-287 290 Div. 12, 23
(TISTB/LMH) OTS price $1.10

Aerospace Information Div., Washington, D.C.
DETAILS ON THE SOVIET SPACE PROGRAM.
16 Oct 62, 2p. (AID rept. no. 62-169 Trans. from Belikov, V. We are Preparing for New Launchings. Izvestiya 4, 4 Oct 64)
Unclassified report

DESCRIPTORS: *Space flight, *Pilots, Aviation personnel, Selection, Training, Manned, USSR.

Some interesting details on the Soviet space program which were not found in previous Soviet literature are discussed. These discussions conclude that the cabin of the Soviet spaceship-satellites used in the experiments with dogs is similar to the Vostok-type spaceship cabin because the cabin of the fifth spaceship-satellite was used for the flight simulation training of cosmonauts Gagarin, Titov, Nikolayev, and Popovich. For the next Soviet manned space flight, probably more than one cosmonaut will be used. This statement is based on the discussion of the participation of one of the experienced cosmonauts (Gagarin, Titov, etc.) in the ready subgroup. It is not possible to make a prediction of the approximate launching date on the basis of the remarks relative to the imminence of the next Soviet manned flight. On the one hand Yevgeniy Anatol'yevich says that the next manned flight will not precede the completion of the processing of the data obtained from the Nikolayev and Popovich flights, and on the other he states that the day is not too far off. (Author)

AD-287 417 Div. 12
(TISTA/SEB) OTS price $1.10

Aerospace Information Div., Washington, D. C.
THE VOSTOK SPACESHIP,
by Z. Dobrichovsky. 11 Oct 62, 3p. incl. illus.
(AID rept. no. 62-164; Trans. from Space Tandem, Veda Technika Mladezi, no. 17:582-583, 24 Aug 62)
Unclassified report

DESCRIPTORS: *Satellite vehicles, Design, Translations, USSR.

Some technical aspects of Soviet spaceships of the Vostok series and a diagram of the Vostok-1 spacecraft are reported. (Author)

AD-287 430 Div. 12
(TISTA/SEB) OTS price $1.60

Air Force of Scientific Research and Development, Washington, D. C.
ON A CHARACTERISTIC FUNCTION AND AN INVARIANT TRIPLE INTEGRAL OF SATELLITE MOTION,
by Herbert Knothe. Sep 62, 13p. 1 ref. (Rept. no. AFOSR/DRA 62-17)
Unclassified report

DESCRIPTORS: *Satellite vehicles, Satellite vehicle trajectories, Mathematical analysis, Equations, Theory, Magnetic fields, Earth, Integral equations, Perturbation theory, Motion.

A study is presented on the basis of ''Satellites and Riemannian Geometry'' (Knothe, Mathematics Umbraticola, May 17, 1962). The following deductions lead to explicit representations of the g's in the case of the ''bulge'' potential of the earth, to an explicit expression for the function psi, called the characteristic function of satellite motion, and to an explicit expression for a new invariant triple integral which shows a similarity to Liouville's theorem in Ergodic Theory. (Author)

AD-287 549 Div. 12
(TISTA/SEB) OTS price $3.00

North American Aviation, Inc., Columbus, Ohio.
SPACE RADIATOR ANALYSIS AND DESIGN, PART II.
Final rept.,
by D. B. Mackay. Aug 62, 150p. incl. illus.
(Contract AF 33(616)8323, Proj. 6146)
(ASD TR 61-30, pt. 2) Unclassified report

DESCRIPTORS: *Satellite vehicles, Radiators, Heat transfer, Configuration, Temperature, Design, Mathematical analysis, Theory, Thermal radiation.

Heat transfer analyses of circular plan extended surfaces of space radiators without meteorite protection are presented herein. The circular extended surfaces include rectangular plates of uniform thickness and triangular, trapezoidal, and constant-temperature-gradient profiles. Complete radiator systems are analyzed and illustrative examples are given. The thermal analyses of circular extended surfaces produced relationships between the physical properties and dimensions, element and environmental temperatures, and rates of heat transfer. These are shown graphically for all types of elements. The optimum proportions of space radiator elements having the greatest ratio of heat radiation rate per pound of weight are also indicated graphically, and procedures for their calculation are shown. The discussions on radiators include dimensional-thermal relationships, and the temperature distribution in duct walls for complete units. Equations and graphs using simplifying assumptions are also presented for use in making a quick analysis of heat exchanger performance. Even though approximate, these data will save a designer considerable time in establishing a suitable configuration. General transient systems are also analyzed, as are more complex transient systems wherein a radiator is used for heat exchange to an environment. (Author)

AD-287 633 Div. 12, 29
(TISTB/CCH) OTS price $10.50

Watervliet Arsenal, N. Y.
LISTING OF REQUIREMENTS FOR MISSILE CONTAINER DESIGN.
Oct 62, 137p. incl. illus. tables, 47 refs.
Unclassified report

DESCRIPTORS: *Guided missiles, *Containers, Military requirements, Manufacturing methods, Packaging, Storage, Handling, Reliability, Specifications, Logistics, Transportation.

A guide to the requirements which are to be considered in the initial design of missile containers is presented. Desirable features which should be incorporated in all future designs for similar containers are proposed. These suggestions are based on experience data obtained from experienced personnel who actively participate in research and development, procurement and production, transportation, storage, maintenance, testing and use of missile containers. Some design requirements for the missile container are mandatory, and limit the container designer to specific design criteria. Dynamic shock and vibration criteria are wholly dependent on the allowable loads which the missile itself can withstand, and all the environments which the missile and container are expected to encounter during its service life. (Author)

AD-287 686 Div. 12, 6
(TISTA/VGW) OTS price $5.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ON THE POSSIBILITY OF NOCTURNAL OPTICAL OBSERVATIONS OF ARTIFICIAL SATELLITES,
by G. G. Lengauer. 17 Sep 62, 55p. incl. illus. tables, 24 refs. (Trans. no. FTD-TT-61-351 from Izvestiya Glavnoy Astronomicheskoy Observatorii v Pulkove, 21:6 (165), pp. 83-113, 1960)
Unclassified report

DESCRIPTORS: *Satellite vehicles, *Optical systems, Optical equipment, Searchlights, Night sky, Feasibility studies, Optical tracking, Mathematical analysis.

The installation of cataphotes on artificial satellites is studied. Cataphotes are optical systems which have the property of returning the light incident upon them back to the source from which the light came. By illuminating the satellite with a powerful searchlight it is possible, under certain conditions, to see the star-shaped speck of light formed by the cataphote. The observer, however, must be stationed close to the searchlight, and this necessitates observing the light speck against the bright background of the searchlight beam. On the basis of recently published data, calculations have been made of the brightness of the background formed by the searchlight beam under various observational conditions, and the corresponding limiting stellar magnitudes for a luminous point which is still visible against this background have been determined. (Author)

AD-287 728 Div. 12
(TISTA/SEB) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
HOW A SATELLITE IS CONTROLLED,
by Yuriy Marinin. 28 Aug 62, 3p. (Trans. no. FTD-TT-62-1206 from Sovetskaya Latviya, p. 4, 22 June 1962)
Unclassified report

DESCRIPTORS: *Satellite vehicles, Control, Manned, USSR, Translations, Control systems.

AD-287 795 Div. 12, 28
(TISTB/MD) OTS price $13.50

American Machine and Foundry Co., Stamford, Conn.
HUMAN FACTORS ENGINEERING REVIEW AND EVALUATION OF TITAN WEAPON SYSTEM 107A-2 LAUNCHER, OPERATIONAL BASE.
Final rept.,
by Leo Bricker and Lewis W. Bennett. 30 Oct 62, 191p. incl. illus. tables, 2 refs. (Rept. no. ED7.2.133)
(Contract AF 04(647)465)
Unclassified report

DESCRIPTORS: *Guided missile launchers, *Human engineering, Safety, Intercommunication systems, Portable platforms, Maintenance, Maintenance equipment, Control systems, Safety devices, Operation, Surface to surface.

Detailed results of the human factors engineering review and evaluation of the AMF Launcher System for the 107A-2 Titan Weapon System Operational Base are presented. The report contains a discussion and summary of those equipment items that are significantly different from the training facility equipment and therefore may be combined with the human factors engineering review and evaluation, Weapon System 107A-2 Launcher, OSTF and TF-1 Final Report (AD-274 290,

AD-274 291, AD-274 292) to cover the entire recorded human factors engineering effort on the launcher system. The report contains the results of the many recommendations made by the Human Factors Engineering Group and includes product improvement recommendations to increase operational effectiveness. (Author)

AD-287 836 Div. 12
(TISTA/SEB) OTS price $26.00

Aerospace Corp., Los Angeles, Calif.
TRANSACTIONS OF THE SEVENTH SYMPOSIUM ON BALLISTIC MISSILE AND SPACE TECHNOLOGY HELD AT THE UNITED STATES AIR FORCE ACADEMY ON 13-16 AUGUST 1962. VOLUME I. SPACE VEHICLES AND SYSTEM DESIGN HYPERSONICS AND RE-ENTRY TECHNIQUES PROPULSION STRUCTURES AND MATERIALS MATHEMATICAL RELIABILITY TECHNIQUES.
1962, 536p. incl. illus. tables, refs.
(Sponsored by Air Force Systems Command)
Unclassified report

DESCRIPTORS: *Spaceships, *Hypersonics, *Rocket motors, *Reliability, *Symposia, Design, Mathematical prediction, Materials, Re-entry aerodynamics, Heat transfer, Refractory materials, Failure (Mechanics), Moon, Landing, Radiation hazards, Ablation, Nuclear propulsion, Recovery, Booster rockets, Electronic equipment, Radar decoys, Guided missiles, Gust loads, Decontamination, Wakes, Propellant grains, Satellite vehicle research.

Contents: Locomotion analysis of lunar surface vehicles; Penetration studies of simulated lunar dust; Sterilization of electronic components of spacecrafts; Injection conditions for earth-moon trajectories; Reuseability and disposal of nuclear systems in space; Self-luminous hypersonic wake radiation measurement and flow visualization; Ballistic missile decoy optimization - programming; Flat plate surface hypersonic heat transfer; Dielectrophoretic propellant orientation in zero gravity; Heat transfer and ablation in aft-closures of solid motors; Nuclear propulsion for orbit-based spacecraft; Oxidation protection of refractory metals in aerospace; A non-parametric technique for reliability comparisons; Failure prediction for nonmaintainable electronic components; and Reliability as a thermostructural design criterion.

AD-287 837 Div. 12
(TISTA/SEB) OTS price $22.25

Aerospace Corp., Los Angeles, Calif.
TRANSACTIONS OF THE SEVENTH SYMPOSIUM ON BALLISTIC MISSILE AND SPACE TECHNOLOGY HELD AT THE UNITED STATES AIR FORCE ACADEMY ON 13-16 AUGUST 1962. VOLUME II. EARTH SATELLITE CONTROL AND CONTROL SYSTEMS CONTROL OF MANNED SPACE ENVIRONMENT SIMULATION COMMUNICATIONS.
1962, 441p. incl. illus. tables, refs.
(Sponsored by Air Force Systems Command)
Unclassified report

DESCRIPTORS: *Control systems, *Satellite vehicles, *Controlled atmospheres, *Simulation, *Symposia, Booster rockets, Re-entry vehicles, Satellite altitude, Orbital flight paths, Manned, Digital systems, Inertial guidance, Water, Freezing, Recovery, Rotation, Spaceship cabins, Spaceships, Moon, Lunar probes, Position finding, Aerial reconnaisssance, Optical filters, Satellite vehicle research.

Contents:
Satellite booster control
Control of re-entry from orbit
Satellite inertia-wheel attitude control on elliptical orbits
A digital adaptive flight control system for flexible missiles
Manned control of large space boosters
Water recovery by reiterative freezing
Ultrasonics - control for space and submarine bio-ecosystems and ecosubsystems
Vestibular disturbances from a rotating environment
Bioluminescence as a physiological index
Lunar tracker mathematical techniques and digital simulation
Spatial filtering
Simulation of map correlation for ballistic or orbital weapon terminal correction
Celestial background simulation techniques
Study of the multisatellite control problems

AD-287 867 Div. 12, 19, 2
(TISTW/RD) OTS price $4.60

Geophysics Corp. of America, Bedford, Mass.
SATELLITE NAVIGATION BY TERRESTRIAL OCCULTATIONS OF STARS I: GENERAL CONSIDERATIONS NEGLECTING ATMOSPHERIC REFRACTION AND EXTINCTION,
by Ali M. Naqvi. Oct 62, 43p. incl. illus. tables, 7 refs. (GCA Technical rept. no. 62-18-A)
(Contract AF 33(616)7413)
Unclassified report

DESCRIPTORS: *Satellite vehicles, *Space navigation, Celestial navigation, Celestial mechanics, Stellar eclipses, Stars, Satellite vehicle trajectories, Orbital flight paths, Navigation.

The condition for terrestrial occultation of a star as seen from a satellite is derived in terms of the orbital elements of the satellite and the equatorial coordinates of the star. An occultation equation relating the time of occultation to the orbital elements is also derived. Relevant stellar properties are discussed. The frequency of occultations as a function of perigee distance and eccentricity of the orbit is obtained. A general discussion of the minimum number of stars required for satellite navigation, and the corresponding limiting magnitude of the satellite-borne telescope is given. Except for references to other reports of this series where atmospheric effects are considered, all results are derived on the assumption that the earth is a perfect sphere and has no atmosphere. (Author)

AD-287 868 Div. 12, 19, 2
(TISTW/RD) OTS price $4.60

Geophysics Corp. of America, Bedford, Mass.
SATELLITE NAVIGATION BY TERRESTRIAL OCCULTATIONS OF STARS II: CONSIDERATIONS RELATING TO REFRACTION AND EXTINCTION,
by Ali M. Naqvi. Oct 62, 39p. incl. illus. tables, 17 refs. (GCA Technical rept. no. 62-21-A)
(Contract AF 33(616)7413)
Unclassified report

DESCRIPTORS: *Satellite vehicles, *Space navigation, Celestial navigation, Celestial mechanics, Stellar eclipses, Stars, Satellite vehicle trajectories, Orbital flight paths, Atmospheric refraction, Light, Absorption, Scattering, Atmosphere, Clouds, Light transmission, Navigation.

The refraction and extinction of starlight in the earth's atmosphere, including extinction due to the clouds, as applied to satellite navigation are discussed. It is concluded that the unpredictable variation in the amount and height of clouds make the observations of occulations at the earth's true edge unsuitable. A method of virtual occultation is described in which a

change in direction, intensity, etc., of starlight due to passage through the atmosphere yields information from which the impact parameter of the observed ray can be determined and the satellite orbital elements calculated. Light extinction is preferred over refraction. A wavelength band covering all or part of the region between 0.3 and 0.55 microns is recommended for extinction observations. Calculations of extinction in the atmosphere are presented and further improvements are described. An error of approximately 1/2 km in the satellite position measurement is anticipated due to unpredictable variations in atmospheric density. (Author)

AD-287 869 Div. 12, 19, 2
(TISTW/RD) OTS price $4.60

Geophysics Corp. of America, Bedford, Mass.
SATELLITE NAVIGATION BY TERRESTRIAL OCCULATIONS OF STARS III: INTERFERENCE DUE TO BRIGHTNESS OF THE EARTH'S ATMOSPHERE,
by Rollin C. Jones and Ali M. Naqvi. Oct 62, 39p. incl. illus. tables, 25 refs. (GCA Technical rept. no. 62-22-A)
(Contract AF 33(616)7413)
Unclassified report

DESCRIPTORS: *Satellite vehicles, *Space navigation, Celestial navigation, Celestial mechanics, Stellar eclipses, Stars, Aurorae, Light, Scattering, Moon, Clouds, Navigation.

The radiance of the earth's atmosphere due to day and night airglow, noctilucent clouds, aurorae and Rayleigh scattering of the light from the sun and the moon is investigated and compared with the radiation received from some typical stars. Daytime observations of star occultations are ruled out on account of the very large radiance due to the scattering of sunlight. For nighttime observations the radiance due to night airglow and scattering of moonlight, especially near the full-moon phase, is likely to be troublesome. (Author)

AD-287 881 Div. 12
(TISTA/SEB) OTS price $3.60

Massachusetts Inst. of Tech., Cambridge.
OPTIMUM SOFT LANDING TRAJECTORIES. PART 2: NUMERICAL RESULTS,
by Lawrence J. Berman. 31 Oct 61, rev. 30 Mar 62, 33p. incl. illus. tables, 4 refs.
(Contract AF 49(638)363)
(AFOSR-519)
Unclassified report

DESCRIPTORS: *Satellite vehicles, Lunar probes, Flight paths, Moon, Impact shock, Landing impact, Spaceships, Space flights, Calculus of variations, Theory, Motion, Equations, Vibration isolators, Landing.

The optimum steering program for landing on an airless body is examined numerically with particular emphasis on the change in the form of the steering program and the degradation of performance under the influence of a restraint on the ignition altitude. It is found that for ignition altitudes not far below the optimum, the performance loss is small, and that the ignition altitude for which the optimum steering program is a constant angle falls within this range. Thus it is concluded that the constant-thrust-angle trajectory is optimum in an operational system. This conclusion is valid only for relatively steep approach trajectories. (Author)

AD-287 890 Div. 12
(TISTA/SEB) OTS price $8.10

General Electric Co., Cincinnati, Ohio.
SPACECRAFT ELECTRIC GENERATING AND PROPULSION SYSTEM INTEGRATION.
Quarterly status rept. no. 2 for period ending 30 Sep 62. 30 Sep 62, 1v. incl. illus. tables, refs.
(Contract AF 33(657)8488)
Unclassified report

This report includes:
MARS ORBITER PARAMETRIC STUDY - 1 MW ION ENGINE, by J. McCullough. 1962. (Rept. no. DM62-219)

DESCRIPTORS: *Thermal radiation, *Electric propulsion, *Research program administration, Air force operations, Radiators, Ion rockets, Plasma jets, Space probes, Mars, Mathematical analyses, Nuclear propulsion, Statistical analysis, Design, Electric power production, Shielding, Digital computers, Programming, Transmission lines, Rocket research.

A working manual and digital computer program is being developed for the system design analysis and optimization procedure known as LEADER. This procedure is then to be applied to space power-propulsion systems employing the SPUR 350 KW and 1000 KW nuclear space power plants. Basic design data is being obtained relating to space turbogenerators, power conditioning equipment, frequency and voltage control equipment, and arc jet and ion engine types of electrical propulsion engines. As an initial phase of the contract effort, the LEADER procedure was applied to the solution of 2 illustrative problems, optimization of a nuclear space power plant - transmission line system, and optimization of the design of a space power plant condensing radiator panel. The application of LEADER to the solution of these 2 problems is described in detail. (Author)

AD-287 891 Div. 12
(TISTA/SEB) OTS price $1.10

Hughes Aircraft Co., Culver City, Calif.
THE RADC PASSIVE SATELLITE COMMUNICATIONS RESEARCH TERMINAL,
by A. Feiner, L. C. Parode, and R. C. Winterbottom. 1962, 7p. incl. illus.
(Sponsored by Rome Air Development Center)
Unclassified report

DESCRIPTORS: *Satellite vehicles, *Radar stations, Communication systems, Design, Tracking, Radar tracking.

A general design of a passive satellite communications research terminal is given. Diagrams are given for the tracking and communications receiver, integration of RADAT track loop and Commo Demodulators, and the voice-channel demodulators.

13. INSTALLATIONS AND CONSTRUCTION

AD-286 931 Div. 13
(TISTM/EJH) OTS price $6.00

Massachusetts Inst. of Tech., Cambridge.
STATUS OF KNOWLEDGE OF GROUND WATER CONTAMINANTS, by William E. Stanley and Rolf Eliassen. Dec 60, 465p. refs.
(Contract HA(--)fh-757)
Unclassified report

DESCRIPTORS: *Water, *Hydrology, *Bibliography, *Contamination, *Water supplies, Public health, Radiological contamination, Standards, Sanitary engineering, Chemicals, Decontamination, Civil engineering.

Contents:
Outline of investigation - scope and conduct of survey, data, literature analysis, water quality standards, contamination
Summary of literature and suggested investigations
Supplemental information on selected contaminants

AD-286 933 Div. 13
(TISTB/LMH) OTS price $11.00

Texas U., Austin.
ATTITUDES AND KNOWLEDGE CONCERNING FALLOUT SHELTERS IN AUSTIN, TEXAS,
by Harry Estill Moore. Jan 62, 139p. incl. tables.
(Contract CDM-SR 62-2)
Unclassified report

DESCRIPTORS: *Shelters, *Civil defense systems, Leadership, Group dynamics, Attitudes, Behavior, Public health, Statistical data, Sociometrics, Disasters, Nuclear warfare, Psychology.

AD-286 958 Div. 13
(TISTB/CCH) OTS price $2.60

Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
NOTES ON THE CONSTRUCTION OF SEEPAGE PITS,
by Thomas W. Bendixen, Richard E. Thomas, and James B. Coulter. 22 June 59, 23p. incl. illus.
Unclassified report

DESCRIPTORS: *Sanitary engineering, Construction, Sewage, Instrumentation, Maintenance, Soils, Design.

A study of septic tank-seepage pit systems is presented. Numerous state and local health departments were visted to review practices in the use of seepage pits. Field investigations were conducted in 7 counties in 3 states in which pits were intensively studied. Some 1000 home owners were interviewed and questioned regarding use and operation of their systems. Approximately 500 pits were opened for observation and 200 were studied in detail with respect to design and construction. Several hundred new pits have been observed during construction. The various construction practices encountered and attempts to delineate the good features from the bad features are summarized. (Author)

AD-287 049 Div. 13
(TISTE/CAM) OTS price $2.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
SUPPORTING CAPACITY OF PROCESSED SNOW RUNWAYS,
by Albert F. Wuori. Aug 62, 16p. incl. illus. table, 3 refs. (Technical rept. no. 82)
(DA Proj. 8-66-02-400)
Unclassified report

DESCRIPTORS: *Snow roads, *Runways, *Snow, Load distribution, Deformation, Design, Trafficability, Test equipment, Vehicle wheels, Model tests.

A study of the wheel-load supporting capacity of processed snow runways was conducted. Static load tests were made on processed snow in test bins to determine the extent of disturbance by a surface load and type of failure produced. Test sections of processed snow runways were trafficked with an aircraft tire using wheel loads up to 35,000 lb. Ram hardness, unconfined compression, and California Bearing Ratio field tests were also performed, and results of the tests were compared. It was found that it will be possible to predict the supporting capacity of snow pavements from the results of simple tests, especially the ram hardness tests. (Author)

14. MATERIALS (NON-METALLIC)

AD-286 986 Div. 14
(TISTM/EJH) OTS price $1.10

General Dynamics/Fort Worth, Tex.
MATERIAL - FOAMGLAS INSULATION - ANALYSIS OF,
by H. R. Houghton, Jr. 10 Sep 62, 6p. incl. tables (Rept. no. FTDM-1577)
(Contract AF 33(657)7248)
Unclassified report

DESCRIPTORS: *Refractory materials, *Thermal insulation, *Glass textiles, *Heat resistant glass, High temperature research, Radiation effects, Insulating materials, Silicon compounds, Dioxides, Impurities, Spectrographic analysis, X-ray diffraction analysis, Sodium, Glass, Foams.

The object of this investigation was to establish a material for use as thermal insulation in Boral boxes which will be used in high temperature radiation effect studies. The material must not become radioactive to a point where it will be a health hazard. Emission spectrography was used to determine qualitatively the main constituents of Foamglas and Refrasil. Three materials were screened for sodium; Foamglas could not be further considered because of high sodium content. Refrasil B-100 Batt was recommended for thermal insulation in high temperature radiation effects studies. (Author)

AD-287 012 Div. 14, 8, 26
(TISTM/TCG) OTS price $1.60

ITT Federal Labs., Nutley, N. J.
DEVELOPMENT OF MANUFACTURING PROCESS FOR HIGH PURITY ELECTRONIC CERAMICS.
Interim technical progress rept., 1 June-31 Aug 62 on Phase 2,
by J. H. Battle, A. J. Marino, Jr., and E. W. Currier. Sep 62, 14p. incl. tables, 5 refs.
(Contract AF 33(600)42473, Proj. 7-772)
(ASD TR 7-772, vol. 6) Unclassified report

DESCRIPTORS: *Ceramic materials, *Barium compounds, *Ferroelectric materials, *Piezoelectric materials, Titanates, Zirconates, Niobates, Tantalum compounds, Chemical analysis, X-ray diffraction analysis, Production, Manufacturing methods.

The purpose of this project is to develop new or improved manufacturing methods for large scale production of ferroelectric or piezoelectric ceramic materials such as titanates, zirconates, niobates, and tantalates. A major requirement is high purity (99.95%). The accomplishments include the operation of a pilot plant, the chemical and x-ray analyses of its product and the ceramic processing of the powders. The synthesis of $BaTiO_3$ in the pilot plant was a successful scale-up of the bench scale runs. Product analysis shows it to be within allowable impurity tolerances and is stoichiometric within analytical detection limits. (Author)

AD-287 029 Div. 14, 32
(TISTM/TCG) OTS price $1.75

Defense Metals Information Center, Columbus, Ohio.
SUMMARY OF THE SIXTH MEETING OF THE REFRACTORY COMPOSITES WORKING GROUP,
by W. A. Gibeaut and D. J. Maykuth. 24 Sep 62, 65p. incl. illus. tables (DMIC rept. no. 175)
(Contract AF 33(616)7747, Proj. no. 2(8-8975)
Unclassified report

DESCRIPTORS: *Refractory materials, *Composite materials, *Refractory coatings, *Ceramic materials, Metals, Rocket motor nozzles, Coatings, Fibers, Flame spraying, Plasma jets, High temperature research, Ultrasonics, Non-destructive testing, Alloys, Symposia.

Information on refractory composites for use above 2500 F, presented at the Sixth Refractory Composites Working Group Meeting in Dayton in June, 1962, is summarized. Protective coatings, insulating ceramics, dispersion strengthening, plasma spraying, high-temperature reactions, and testing techniques were discussed. The time-temperature capabilities of metallic and intermetallic coatings for Va, Nb, Mo, Ta, and W are steadily being increased by improved processing techniques and chemical modification. Insulating ceramics were developed for critical nose-cap and other applications. Structural and thermal stability are reported at 3500 F for A1203-base systems and at 4200 F for ZrO2-base systems. Graphite, a refractory material which lacks oxidation resistance, was chemically modified to improve oxidation performance markedly at temperatures up to 4200 F. (Author)

AD-287 149 Div. 14
(TISTM/ODN) OTS price $2.60

General Dynamics/Convair, San Diego, Calif.
CORROSION RESISTANCE, ELECTRICAL CONDUCTIVITY AND ADHESION CHARACTERISTICS ON MATERIAL - COATINGS AND ADHESION CHARACTERISTICS,
by A. F. Hooper, J. C. George, and E. E. Keller. 10 Mar 60, 19p. incl. illus. tables (Rept. no. 8926-033)
(Contract AF 04(645)4)
Unclassified report

DESCRIPTORS: *Coatings, *Corrosion inhibition, Electrical conductance, Aluminum, Stainless steel, Alloys, Aluminum alloys, Resistance, Corrosion, Varnishes, Films, Zinc compounds, Chromates, Paints, Sea water, Sprays, Tests, Humidity, Adhesion.

Twelve commercial chemical conversion coatings for Al, which conform with Mil-C-5541 requirements, were evaluated when applied to 2024-T3 clad and bare, and 7075-T6 clad and bare Al alloys. Salt spray, 100% relative humidity and atmospheric testing were done with coated, coated and lacquered, and galvanically coupled (Type 301 stainless steel) specimens. The electrical conductivity of the various coatings was determined by resistance measurement. Paint adhesion was determined by impact shock resistance methods. Wide variations were not found in the corrosion protection afforded by the several materials although Alodine 600 offered a slight advantage. Appreciable reductions in the electrical conductivity of surfaces resulted from chemical conversion film application. These reductions tended to be specific with each Al alloy surface responding best to a specific proprietary coating. Impact shock tests with a wash prime-$ZnCrO_4$ lacquer primer-lacquer topcoat paint system indicated better adhesion with Alodine 1000 and Bonderite 710 chemical films. (Author)

AD-287 150 Div. 14
(TISTM/RGR) OTS price $1.10

General Dynamics/Convair, San Diego, Calif.
THERMAL CONDUCTIVITY ON MATERIAL - INSULATION - THERMAL - SILICONE RUBBER FOAM, FIBERGLAS BATTING COMPOSITE, EPOXY BONDED MICROBALOON,
by E. A. Wharenbrock, F. Graber, E. E. Keller. 25 Aug 59, 6p. incl. table (Rept. no. 8926-008)
(Contract NOa(s) 58-853-c)
Unclassified report

DESCRIPTORS: *Thermal insulation, *Silicone resins, *Expanded plastics, *Composite materials, *Glass textiles, *Epoxy resins, *Thermal conductivity, Test methods, Radar tracking, Radar equipment, Materials.

Guarded hot plate measurements with 250, 350 and 450 F hot face, and 120 F cold face temperatures were made with a foamed silicone rubber, a sewn fiberglass cloth, batting, and aluminum foil blanket composite, and an epoxy resin microbaloon composite. Thermal conductivity factors with BTU/in/hr were determined at 120-250, 120-350, and 120-450 F. Silicone rubber foam: 0.35, 0.40, 0.45; Fiberglas composite: 0.44, 0.42, 0.47; Epoxy bonded microbaloon: 0.96, 1.00, 1.20. Preparation details of each material are given. (Author)

AD-287 159 Div. 14
(TISTM/RGR) OTS price $5.60

Illinois U., Urbana.
ON THE MECHANICAL BEHAVIOR AND FRACTURE MORPHOLOGY OF EPOXY RESIN,
by C. E. Feltner. Aug 62, 14p. illus. tables, 25 refs. (T&AM rept. no. 224)
(Contract Nonr-294702)
Unclassified report

DESCRIPTORS: *Epoxy resins, *Fracture (Mechanics), *Neutron bombardment, *Plastics, Acrylic resins, Radiation effects, Thermosetting resins, Polymers, Surface properties, Theory, Stresses.

Tensile specimens of irradiated and non-irradiated epoxy resin were broken by static loading using various strain rates and a study was made of the origin, development and characteristic patterns of the fracture surface markings. In nearly all cases fractures originated at inclusions or bubbles even when reasonable care was exercised in casting the resin. Epoxy resin exhibits 3 different types of stress-strain curve which have been termed normal, transition and premature. The slope of the stress-strain curve at fracture serves as an index of the degree of prematurity or normalcy of the fracture; positive and negative slopes being termed premature and normal, respectively. Examination of the corresponding fracture surfaces discloses that normal fractures are always accompanied by a considerable amount of slow crack extension while on the other hand little or no slow crack growth occurs in a premature fracture. Quantitatively, the relation between the fracture stress and the stable flaw size agrees reasonably well with the Griffith theory when the mirror is considered to be the Griffith flaw. Fractures started internally in some of the epoxy samples but at the edges of all of the others. In most respects the characteristic features of a fracture surface of epoxy resin are similar to those of other polymers such as polymethyl methacrylate. (Author)

AD-287 165 Div. 14, 8, 7
(TISTM/EJH) OTS price $3.60

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
DEVELOPMENT OF CERAMIC DIELECTRICS.
Progress rept. no. 7, 1 Mar-1 June 60,
by E. J. Smoke, C. J. Phillips and others.
1 June 60, 58p. incl. illus. tables.
(Contract DA 36-039-sc-78084)
Unclassified report

DESCRIPTORS: *Dielectrics, *Electric insulation, *Ceramic materials, *Ferroelectric materials, Barium compounds, Aluminum compounds, Oxides, Titanates, Crystals, Glass, Manufacturing methods, Heat treatment, Crystallization, Dielectric properties, Electrical properties, Mechanical properties.

Results are reported in attempting to utilize the devitrification process for ferroelectric ceramics. Frits were made and bodies prepared from the frits ranging from 85 to 91% $BaTiO_3$, the remainder being B_2O_3. $BaTiO_3$ is the crystalline phase devitrified from the 91% $BaTiO_3$ frit while and unknown crystalline phase results at lower $BaTiO_3$ contents. Electrical data versus temperature and frequency are reported. The electrical properties of bodies produced by the devitrification of glass frits containing 91 parts of $BaTiO_3$ and 9 parts of B_2O_3 plus small additions of the oxides of Fe, Ni and Sn are reported. Dielectric constants for these bodies are approximately 30 and dissipation factors about 0.019. The as-received strength of a random sample of 25 micromodule wafers (94-96% Al_2O_3) is reported. Thermal conditioning data are presented and evaluated. (Author)

AD-287 166 Div. 14, 25, 8
(TISTM/SJR) OTS price $8.10

New Jersey Ceramic Research Station, Ruters U., New Brunswick.
DEVELOPMENT OF CERAMIC DIELECTRICS.
Progress rept. no. 8 (Final), 1 June-1 Sep 60,
by E. J. Smoke, C. J. Phillips and others.
1 Sep 60, 74p. incl. illus. tables.
(Contract DA 36-039-sc-78084)
Unclassified report

DESCRIPTORS: *Ceramic materials, *Dielectrics, *Ferroelectric materials, Electrical properties, Mechanical properties, Manufacturing methods, Phosphate glass, Glass, Boron compounds, Nitrides, Oxides, Heat treatment, Barium compounds, Titanates, Crystal structure, Aluminum compounds, Lithium compounds, Silicates, Germanium compounds, Thermal stresses, Shock, Impact shock, Density, X-ray diffraction analysis, Lead compounds, Calcium compounds, Insulating materials, Materials.

The requirements for high thermal shock resistance were fulfilled by a type ceramic whose principal crystalline phase is beta-spodumene when it is prepared by the devitrification process. Work on high impact resistance has proven that impact resistance varies directly as strength and that only marginal improvements can be made conventionally. In the research on precision molded and machined radio ceramics, compositions were developed which result in ceramics which exhibit very low firing shrinkage. The firing shrinkage varies from a high of 2.5% for the cast process to 1.5% expansion for dry pressing. The relationship of compositions and particle size distributions of pre-sintered compositions was determined for the high alumina type ceramics for producing bodies of high percentages of true density (96-99%). Electrical properties approaching that of fused silica were attained with B phosphate-silica type ceramic in experiments on ultra low loss materials. This composition can only be prepared by the devitrification process.

AD-287 167 Div. 14, 25, 8
(TISTM/SJR) OTS price $7.60

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
INORGANIC DIELECTRICS RESEARCH.
Progress rept. no. 1, 1 Sep-1 Dec 60,
by E. J. Smoke, C. J. Phillips and others.
1 Dec 60, 65p. incl. illus. tables.
(Contract DA 36-039-sc-85385)
Unclassified report

DESCRIPTORS: *Ceramic materials, *Dielectrics, *Crystal structure, *Ferroelectric materials, Microwave equipment, Silica-free glass, Glass, Boron compounds, Phosphate glass, Silicon compounds, Dioxides, Aluminates, Lanthanum compounds, X-ray diffraction analysis, Heat treatment, Manufacturing methods, Density, Electrical properties, Mechanical properties, Barium compounds, Titanates, Flame spraying, Crystal ovens, Calcium compounds, Insulating materials, Materials.

A comparative study is reported on a boron phosphate silica type composition prepared as a glass, a devitrified body and hot pressed body. The electrical properties versus temperature and frequency indicate that this type composition approaches fused silica. Specimens of lanthanum aluminate were prepared by sintering and hot pressing. A dielectric constant of 25 was obtained for this material. The as-received strength of random samples of 10 types of micromodule wafers is reported. The two approaches to making barium titanate glass are the use of new glass formers and faster frit quenching methods in order to produce a good glass free of devitrified material. A calcium boro-aluminate frit was substituted as the glass former and the flame spraying of 100% $BaTiO_3$ was tried both in an oxygen-hydrogen flame and an oxygen-acetylene flame. A study was initiated to attempt to remove the glass forming oxide (B_2O_3) from the barium titanate-boric oxide frit. The object is to increase the barium titanate content in order to improve the dielectric properties of this type of ferroelectric.

AD-287 168 Div. 14, 25, 8
(TISTM/SJR) OTS price $7.60

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
INORGANIC DIELECTRICS RESEARCH.
Progress rept. no. 2, 1 Dec-1 Mar 61,
by E. J. Smoke, C. J. Phillips and others.
1 Mar 61, 63p. incl. illus. tables.
(Contract DA 36-039-sc-85385)
Unclassified report

DESCRIPTORS: *Ceramic materials, *Dielectrics, *Crystal structure, *Ferroelectric materials, Microwave equipment, Oxides, Lanthanum compounds, Aluminates, Dioxides, Silicon compounds, Glass, Boron compounds, Nitrides, Heat treatment, Manufacturing methods, Barium compounds, Titanium compounds, Titanates, Extrusion, Flame spraying, Density, Mechanical properties, Electrical properties, Phosphate glass, Calcium compounds, Insulating materials, Materials.

Low loss microwave ceramic dielectrics on compounds were investigated in the ternary system La_2O_3-SiO_2-Al_2O_3. In work on low loss boron nitride ceramic dielectrics bodies containing boron nitride and two undevitrifiable glasses were prepared and evaluated. Hot pressing and sintering were employed in an effort to produce dense translucent aluminum oxide bodies. Theoretical density was achieved by hot pressing but the specimens were contaminated with graphite from the mold used. Temperatures reached in gas firing were not high enough to produce maximum density. Results of thermal conditioning of micromodule wafers having $BaTiO_3$ and TiO_2 as their chief crystalline phase are reported. The effects of conditioning upon camber and electrical properties are discussed. The results obtained in the conditioning of wafers are compared with those obtained in the earlier work on rod-shaped specimens. Work on high temperature extrusion of barium titanate is in preliminary stages. A review of the progress made in this area is reported along with a resume of the work reported by Nuclear Metals, Inc. A 150 ton press has been ordered to continue this work.

AD-287 172 Div. 14, 25, 8
(TISTM/SJR) OTS price $8.10

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
DEVELOPMENT OF CERAMIC DIELECTRICS.
Progress rept. no. 6, 1 Dec 59-1 Mar 60,
by E. J. Smoke, C. J. Phillips and others.
1 Mar 60, 83p. incl. illus. tables.
(Contract DA 36-039-sc-78084)
Unclassified report

DESCRIPTORS: *Ceramic materials, *Dielectrics, *Ferroelectric materials, Crystal structure, Electrical properties, Mechanical properties, Manufacturing methods, Glass, Phosphate glass, Lithium compounds, Aluminum compounds, Silicates, Dioxides, Titanium compounds, Oxides, Magnesium compounds, Thermal stresses, Shock, X-ray diffraction analysis, Boron compounds, Nitrides, Heat treatment, Density, Dielectric properties, Microscopy, Particles, Measurement, Insulating materials, Materials.

The control of properties by structural means through substitution in the RO, R_2O_3 and RO_2 groups of a complex crystalline phase such as beta-spodumene is investigated. Combinations of 3 alkalies additives to composition F-E(1) (55% SiO_2 - 45% BPO_4) were studied. Results (1 Mc) are reported for all compositions prepared as glasses and as bodies devitrified from the glasses. A preliminary study of boron nitride additions to composite F-E(1) is reported, the objective being to determine its effect of ultra low loss properties of this type composition. An attempt to prepare 100% boron nitride ceramics under normal firing environment is reported along with the general properties of this material. A loading mechanism for the micromodule strength testing apparatus is described. Preliminary data on as-received strength are reported and discussed. A study of the effect of small variations in particle size distribution and composition and the sinterability and densification of a high alumina body (92%) was undertaken. (Author)

AD-287 214 Div. 14, 12, 25
(TISTM/TCG) OTS price $6.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
BEHAVIOR OF PLASTICS UNDER IMPULSIVE STRESS.
Final interim rept.,
by W. T. Barry, H. W. Semon and others. Sep 62,
70p. incl. illus. tables.
(Contract AF 29(601)4418, Proj. 5776)
(AFSWC TDR 62-85) Unclassified report

DESCRIPTORS: *Plastics, *Resins, *Phenolic resins, *Impact shock, Thermal stresses, Stresses, Mechanical properties, Shielding, Materials, Fracture (Mechanics), Equations of state, Test methods, Spallation, Ablation, Erosion, Deterioration, Pulse modulation, Loading, Microscopy, Vulnerability.

The impulsive loading of GE Century Resins revealed that, for the glassy, more rigid materials, disk-shaped fractures were formed, approximately circular, having central initiation sites of irregular shape. For the rubbery compounds conically-shaped, rosette-type fractures were formed. In general, impact velocities for threshold fracture were greater for the rubbery materials than for the glassy materials. The impacts were produced by compressed gas-driven flying plates. Where equation of state data were known, initial impact pressures were

obtained. For the rigid materials studied in most detail, both the fracture disk and initiation site diameters increased with increasing driver thickness. Particles and discontinuities purposely introduced during specimen casting did not increase the number of fractures or change the initial impact pressures for fracture. Detailed microscopic examination of initiation sites indicated the need for more knowledge about the shape of the stress pulse. (Author)

AD-287 297 Div. 14, 26, 12
(TISTM/TCG) OTS price $2.60

Goodyear Aircraft Corp., Akron, Ohio.
STRUCTURAL FABRIC PROGRAM.
Interim technical progress rept. no. 5, 1 July-30 Sep 62,
by J. O. Miller and E. Bilsky. Sep 62, 21p. incl. illus.
(Contract AF 33(600)43036, Proj. 7-904)
(ASD TR 7-904, vol. 5) Unclassified report

DESCRIPTORS: *Textiles, *Metallic textiles, *Synthetic fibers, Structures, Materials, Industrial equipment, Machines, Design, Density, Packaging, Specifications, Wire, Processing, Manufacturing methods, Re-entry vehicles, Gliders.

The purpose of this program, as related to aerospace application, is to provide a means of manufacturing large low-density Airmat structures made of metallic cloth and yarns capable of small volume packaging. A mock up of the multi-hook drop yarn extension mechanism was successfully tested on GAC's 60-in plush loom and the detail design and fabrication of the structural fabric loom was initiated. Efforts are directed toward the development of a loom procurement of a loom capable of producing a low-density Airmat in the order of 20 ft wide with a maximum depth of 8 ft. (Author)

AD-287 404 Div. 14, 26
(TISTM/EJH) OTS price $2.50

Armour Research Foundation, Chicago, Ill.
INVESTIGATION OF GLASS FIBER STRENGTH ENHANCEMENT THROUGH BUNDLE DRAWING.
Final rept., 6 Jan 61-6 Apr 62,
by N. A. Weil, J. S. Islinger, and D. W. Levinson. May 62, 95p. incl. illus. tables, 71 refs.
(Contract NOw 61-0259-c)
Unclassified report

DESCRIPTORS: *Glass textiles, *Synthetic fibers, *Ceramic fibers, Filaments, Fibers, Drawing (Machine processing), Metal coatings, Metals, Alloys, Wetting agents, Aluminum alloys, Silicon alloys, Lead alloys, Indium alloys, Glass, Ceramic coatings, Configuration, Mechanical properties, Theory, Mathematical analysis, Industrial equipment, Manufacturing methods.

A theoretical review and new analytical derivations are presented which give a reasonably detailed coverage of the state-of-the-art concerning strength theories for glasses, experimental evidence of the strength/size relationship in glass fibers and a newly completed analysis predicting the interrelationships between variables for glass fibers drawn from rods. The theoretical analysis shows that there is a very real limitation of fiber size such that no fibers below a certain diameter can be drawn in monofilament drawing operations. Ultra fine diameter fibers may be obtained only by the bundle drawing process. The feasibility of the bundle drawing process in producing very fine glass filaments within bundle drawn fibers was shown experimentally. Protective metallic coating techniques were developed but require further work before the method becomes capable of producing discrete ultra fine fibers with enhanced strength characteristics. (Author)

AD-287 445 Div. 14
(TISTM/ODN) OTS price $2.60

Illinois U., Urbana.
THE INFLUENCE OF WATER VAPOR AND ANNEALING ON THE STRENGTH OF SODA-LIME GLASS RODS,
by D. Shadman. Sep 62, 21p. incl. illus. tables, 9 refs. (Technical memo. no. 188; T&AM rept. no. 228)
(Contract Nonr-294702, Proj. 62 R05 19A)
Unclassified report

DESCRIPTORS: *Glass, *Rods, *Water vapor, *Corrosion, Theory, Heat treatment, Calcium compounds, Oxides, Mechanical properties, Tests, Failure (Mechanics), Tensile properties, Silicon compounds, Dioxides, Steam.

Corrosion of soda-lime glass rods by water vapor and the resulting effect on the strength of the rods was studied. Due to the thinness of corrosion layer, it was not practical to measure the variation of its thickness with the time of corrosion. Consequently, as a measure of corrosion, the breaking strength of the rods, after being exposed to saturated steam for various lengths of time, was determined. The result of the short time steam treatment was to increase the breaking strength of the rods. However, the strength of the rods decreased considerably upon further treatment. The explanation given for this behavior is based upon the flaw theory. In order to separate the effect of temperature from corrosion on the rods, two groups of specimens were annealed in air at the same temperatuure as the saturated steam. The results obtained were compared with the corroded and untreated control group. (Author)

AD-287 446 Div. 14
(TISTM/TCG) OTS price $1.10

Institute of Paper Chemistry, Appleton, Wis.
DEVELOPMENT OF AN IMPROVED DIFFUSION BOARD MATERIAL.
Monthly rept. no. 23, 29 Aug-28 Sep 62,
by L. E. Leporte and T. A. Howells. 29 Oct 62, 7p. incl. illus. tables.
(Contracts DA 18-108-405-cml-941 and DA 18-108-cml-6561, Proj. 2256)
Unclassified report

DESCRIPTORS: *Plywood, *Fiberboard, *Wood, *Diffusion, Paper, Newspapers, Wetting agents, Wood pulp, Processing, Drying ovens, Forge presses, Density, Carbon dioxide.

The possibility of upgrading the gas life of board produced in any future trials at the Wood Conversion Company by incorporating repulped newspaper in the stock was considered. Boards were formed in the laboratory using repulped newspaper blended in varying proportions with a Wood Conversion Company pulp and wet-pressed at 25, 50, and 100 psi. These boards were tested for density and carbon dioxide diffusivity in order to determine the proportions in which the newspaper could be incorporated with the Wood Conversion pulp. The results of the study indicate that up to 30% of the stock can be made up of repulped newspaper providing that in production operations the machine can be adjusted to produce board with a density of 22 lb/cu ft or less without overloading the drier as a result of increased evaporation requirements imposed by wet-pressing limitations. (Author)

AD-287 467 Div. 14
(TISTB/LMH) OTS price $4.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
DESIGN CONCEPTS AND TECHNIQUES FOR BRANCHED MISSILE CABLES MADE OF SILICONE MATERIALS,
by Andrew R. Blanck. Sep 62, 51p. incl. illus. tables (Technical rept. no. 3002)
Unclassified report

DESCRIPTORS: *Cable assemblies, *Silicones, High temperature research, Flight, Dielectric properties, Moisture, Low temperature research, Guided missiles.

A design for a branched multiconductor cable using silicone materials is presented. The cable is intended for use at high temperatures during missile flight after storage under moist conditions at moderate temperatures. The cable has high heat resistance, excellent low temperature flexibility, heat and oxidative stability, aging and weathering resistance, low moisture absorption, retention of dielectric properties in presence of moisture and contaminants, and radiation resistance. For electrical performance and robustness, the silicone cable design discussed herein represents the best attainable with current materials and in the light of present knowledge and techniques. (Author)

AD-287 500 Div. 14
(TISTM/TCG) OTS price $11.50

New Jersey Ceramic Research Station, Rutgers U., New Brunswick.
STUDY OF HIGH TEMPERATURE MATERIALS.
Final rept.,
by E. J. Smoke, J. Rooda and others. 3 Jan 62, 142p. incl. illus. tables.
(Contract AF 30(602)2058)
(RADC TDR 62-307) Unclassified report

DESCRIPTORS: *Ceramic materials, *Attenuation, *High temperature research, Refractory materials, High frequency, Dielectric properties, Microstructure, Physical properties, Crystals, Density, Additives, Computers, Waveguides, Zirconium compounds, Aluminum compounds, Silicon compounds, Magnesium compounds, Oxides, Clays, Barium compounds, Silicates, Titanates, Electrical properties.

The attenuation properties of ceramic materials are studied over a range of frequency and temperature to attain information which can be utilized in the design of absorbers. The frequencies selected are: 100, 500, 1000, 3000, 8400 and 12,000 mc/sec. The temperatures selected are: room temperature, 500, 1000, 1500 and 2300 F. Three series of ceramic compositions were selected in order to determine the effect of composition, bulk density and several loss mechanisms. Thirty-five compositions were evaluated. The basic formula for computing loss tangent and dielectric constant over the range of low to high loss is derived and programmed to an IBM 650 computer. A discussion of the results along with the raw data and the calculated data is presented. (Author)

AD-287 509 Div. 14, 17
(TISTM/TCG) OTS price $1.60

Thompson Ramo Wooldridge, Inc., Cleveland, Ohio.
DESIGN DATA STUDY FOR COATED COLUMBIUM ALLOYS.
Bimonthly technical progress rept. no. 4, 21 June-21 Aug 62,
by J. D. Gadd. 21 Sep 62, 12p. incl. illus. tables (Rept. no. TM-3512-67)
(Contract Now 62-0098-c)
Unclassified report

DESCRIPTORS: *Coatings, *Refractory coatings, *Niobium alloys, *Silicon coatings, Chromium compounds, Titanium compounds, Ceramic coatings, Oxidation inhibitors, Tantalum alloys, Tungsten alloys, Zirconium alloys, Sheets, Crystallization, Tensile properties, Elasticity, Stresses, Fracture (Mechanics), Metal coatings, Heat treatment, Mechanical properties.

The screening tests of 7 protective coatings applied on D-14 alloy and of Pfaudler, TRW and Vought coatings on FS-85 alloy were completed and reviewed. The Pfaudler and TRW coatings were selected for an extensive design data study of coated FS-85 alloy. Test specimens for the design data study were prepared from 30 mil FS-85 alloy sheet and are being coated by Pfaudler and TRW. Tensile tests were conducted on uncoated FS-85 alloy at temperature intervals from room temperature to 2600 F, establishing base-line properties for evaluation of the coating-base metal systems. (Author)

AD-287 515 Div. 14, 2
(TISTM/EJH) OTS price $2.60

Snell, Foster D., Inc., New York.
DEVELOPMENT OF A SPRAYABLE, STRIPPABLE, PROTECTIVE COATING FOR AIRCRAFT, ROCKETS AND MISSILES.
Progress rept. no. 1, 12 June-11 Sep 62,
by E. Friedman, R. W. Allan and G. R. Weissman. 25 Sep 62, 15p. tables.
(Contract N600(19)58684)
Unclassified report

DESCRIPTORS: *Plastic coatings, *Waxes, *Plasticizers, *Adhesion, Surfaces, Films, Silicones, Aircraft, Guided missiles, Flame spraying, Mechanical properties, Coatings.

Attempts to improve strippability with ''spewing'' plasticizers such as AA Castor oil and Paraplex G-40 were unsuccessful. The search for a parting agent proved successful in some cases. Certain wax emulsions showed promise, such as VP-115, Efton U Fischer-Tropsch wax, and Petronauba W. These wax emulsions improve the strippability from acrylic substrates when used individually or in combination with each other. The use of silicone emulsions in varying degrees of concentration (% solids by weight) have not met with success. (Author)

AD-287 532 Div. 14, 17
(TISTM/EJH) OTS price $2.60

Southern Research Inst., Birmingham, Ala.
THE DEVELOPMENT OF HEAT-RESISTANT PAINTS FOR METALS.
Bimonthly progress rept. no. 2, 13 July-10 Sep 62,
by Marvin McGarity, Franklin Alexander and Stanley E. Mileski. 8 Oct 62, 19p. incl. illus. tables (Rept. no. 5549-1408-2)
(Contract NOw 62-0727-d)
Unclassified report

DESCRIPTORS: *Heat resistant paints, *Phosphate coatings, *Aluminum, High temperature research, Preparation, Coatings, Silicon coatings, Corrosion inhibition, Erosion, Humidity, Bonding, Hardness, Moistureproofing, Weatherproofing, Ethyl radicals, Methyl radicals, Phosphates, Phosphites, Phosphoric acids, Esters, Zinc compounds, Oxides, Amines.

Experiments with ZnO and di-n-butylamine phosphate resulted in the preparation of heat-resistant coatings, but the coatings were not water resistant. Coatings that were hard, well-bonded, heat resistant, and water resistant were produced repeatedly from a mixture of ZnO, DMHP (dimethyl hydrogen phosphite), and a disperion of colloidal silica when they were cured at 72 F and

75% RH; when cured at 70% or 80% RH, the coatings were not heat resistant. The properties of ZnO-DMHP-EAP (ethyl acid phosphate) coatings cured at 72 F and various relative humidites varied erratically, and in no case was a coating obtained that was both water resistant and heat resistant. Coatings of mixtures of ZnO-DMHP and colloidal silica reach constant weight in less that 2 hr when cured in air at normal temperatures. The weight loss corresponds fairly closely to that calculated for the loss of all methyl groups in DMHP and the water in the silica dispersion. Comparison of several methods of pretreatment of Al panels indicates that sanding and washing with acetone is satisfactory. ZnO-DMHP-colloidal silica coatings were exposed for over 300 hr in the WeatherOmeter with no apparent deterioration. (Author)

AD-287 610 Div. 14, 31
(TISTM/RGR) OTS price $3.60

Picatinny Arsenal, Dover, N. J.
SELECTION OF ARTICLES ON PLASTICS AND RESINS FROM THE RUSSIAN PERIODICAL ''SUDOSTROYENIYE'' (SHIPBUILDING),
by V. A. Bernshteyn, I. A. Yelin, and T. A. Kolenkina. Oct 62, 1v. incl. illus. tables. (Technical memo. no. 1015; trans. from Sudostroyeniye 27:pp. 41-49, 51-55, 67 (1961))
Unclassified report

DESCRIPTORS: *Epoxy resins, *Coatings, *Corrosion inhibition, *Ships, *Glass textiles, *Marine propellers, *Resin adhesives, *Metal-plastic adhesives, *Electric insulation, *Ethylenes, *Polymers, *Plastic pipes, *Ship hulls, *Acrylic resins, *Plastic coatings, USSR, Composite materials, Binders, Plasticizers, Plastics, Thermosetting resins, Bonding, Pipes, Welding, Machining.

AD-287 619 Div. 14, 25, 1
(TISTM/ODN) OTS price $1.10

General Dynamics1Convair, San Diego, Calif.
LIGHT TRANSMITTANCE ON MATERIAL - FINISHES AND COATING - S - ANTI-ICING CONDUCTIVE - SIERRACOTE NO. 3, SIERRACIN CORPORATION,
by B. H. Faulkenberry, F. M. Graber, and E. E. Keller. 2 Dec 58, 5p. incl. illus. (Rept. no. 8926-041)
Unclassified report

DESCRIPTORS: *Metallic coatings, *Light transmission, Transparent panels, Laminates, Acrylic resins, Polymers, Vinyl radicals, Resistance, Spectrophotometers, Sheets.

Sierracote #3 is a proprietary metallic coating that can be deposited upon several transparent materials by the Sierracin Corporati6 using general high vacuum techniques. Sierracote #3, an IR reflective material, is used to make transparencies conductive so that they can be heated for snow and ice removal. The transparency on which Sierracote #3 was applied on the inner surface was a laminate comprised of .125 in thick stretched Plex 55 acrylic resin sheet (coated ply), .075 in thick 38PPH DBS PVB polyvinyl butryal sheet (interlayer), and .350 in thick stretched Plex 55 sheet (structural ply). F-106 airplane production transparencies had a resistivity of about 15 ohms/sq in, and these were compared with transparencies having 21.0 ohms and 87.0 ohms/sq in resulting from varying thicknesses of Sierracote #3 applications. Spectrophotometer measurement of transmittance in the 400 to 750 millicron wavelength range indicated only minor differences between the coatings in the visible light range (400 to 700 millimicrons) and a barely appreciable variation in the IR region of 700 to 750 millimicrons. (Author)

AD-287 621 Div. 14
(TISTM/ODN) OTS price $1.10

General Dynamics/Convair, San Diego, Calif.
SKYDROL 500 RESISTANCE ON MATERIAL - ADHESIVES - STRUCTURAL - NARMCO MANUFACTURING CO. NARMCO 3135,
by B. Bergstrom, G. L. Picotte, and E. E. Keller. 21 Jan 60, 4p. incl. table (Rept. no. 8926-037)
Unclassified report

DESCRIPTORS: *Adhesives, *Epoxy resins, Tests, Bonding, Glass textiles, Reinforcing materials, Bonded joints, Storage, Mechanical properties, Alloys, Aluminum alloys, Tensile properties, Fluids, Shear stresses, Aging.

Finger panel specimens of 2024-T3 clad Al alloy, conforming with Mil-B-5090 were bonded with Narmco 3135 adhesive which was reinforced with one layer of 190 Leno weave fiberglass cloth. The Narmco 3135 adhesive is a 2 component epoxy resin system which normally cures at room temperatures in 24 hr. The effect of accelerating curing by heating at 180 F for 2 hr was examined by comparing the strengths of joints stored in air and Skydrol 500 after curing at room temperature and at 180 F. The test results show that curing at 180 F for 2 hr provides greater strength than curing at room temperature, and that Skydrol 500 immersion up to 6 mo duration does not degrade joint strength. (Author)

AD-287 713 Div. 14, 25
(TISTM/ODN) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
RELATION BETWEEN STRUCTURE AND PROPERTIES OF GLASS,
by K. S. Yevstropyev. 9 Oct 62, 15p. incl. illus. table, 15 refs. (Trans. no. FTD-TT-62-1213 from Trudy Tret'ego Vsesoyunogo Soveshohaniya, Leningrad, Third All-Union Congress pp. 39-48, 1959)
Unclassified report

DESCRIPTORS: *Symposia, *Glass, Structures, Bibliography, Chemical properties, Physical properties, Electrical properties, Conductivity, Viscosity, Silicates, Borates, Phosphates, USSR.

A discussion of numerous investigations, with references, of various physico-chemical properties of glasses is presented. Included is a discussion on the structure of silicate, borate, borosilicate, and phosphate systems. The report is a translation from Russian.

AD-287 756 Div. 14, 25
(TISTM/EJH) OTS price $1.25

Cincinnati U., Ohio.
INFRARED SPECTRA OF SOME OILS, GREASES, ADDITIVES, AND RELATED MATERIALS.
Final rept., June-Dec 61 on The Chemistry and Physics of Materials,
by Lee D. Smithson and Michael S. Matta.
Aug 62, 43p. incl. illus. 8 refs.
(Contract AF 33(616)7450, Proj. 7360)
(ASD TDR 62-771) Unclassified report

DESCRIPTORS: *Lubricants, *Oils, *Greases, *Lubricant additives, *Infrared spectroscopy, *Hydraulic fluids, Chemical analysis, Spectrographic analysis, Antioxidants, Additives, Data.

Infrared spectra from 2 to 16 microns of 82 oils, greases, additives, and related materials of

current use in the Air Force are presented as an aid in the qualitative identification of lubricants. (Author)

AD-287 798 Div. 14, 30
(TISTM/TCG) OTS price $3.60

Army Prosthetics Research Lab., Walter Reed Army Medical Center, Washington, D. C.
DETERMINATION OF PARTICLE SIZE DISTRIBUTIONS FOR ACRYLATE LATICES.
by Joshua Nelson. Oct 62, 12p. illus. tables, 7 refs. (Technical rept. no. 6222)
(Proj. 6X59-01-001-04)
Unclassified report

DESCRIPTORS: *Acrylic resins, *Amides, *Colloids, *Crystal structure, Lattices, Polymerization, Particles, Density, Foams, Fractionation, Electron microscopy, Polymers, Test methods.

Mass and number particle size distribution curves were determined for various acrylate-amide latices using a new simple fractional creaming method. Different particle size distributions were found for the latices polymerized by the Army Prosthetics Research Laboratory and the Borden Chemical Company. Particle size analyses can now be run routinely using this new method. (Author)

AD-287 820 Div. 14
(TISTM/ODN) OTS price $1.10

General Dynamics/Fort Worth, Tex.
MATERIAL-FABRIC-FIRE SEAL-WIRE REINFORCED RUBBER COATED-EVALUATION OF.
Test data memo.,
by R. L. Thomas. 26 Oct 62, 3p. incl. tables.
(Rept. no. FTDM 2131)
(Contract AF 33(657)7248)
Unclassified report

DESCRIPTORS: *Textiles, *Reinforcing materials, *Rubber coatings, Seals, Rubber, Wire, Tests, Specifications, Mechanical properties, Physical properties, Flames, Wings.

AD-287 822 Div. 14
(TISTM/ODN) OTS price $1.10

General Dynamics/Fort Worth, Tex.
MATERIAL - FABRIC - FIRE SEAL - WIRE REINFORCED RUBBER COATED - EVALUATION OF.
Test data memo.,
by R. L. Thomas. 26 Oct 62, 3p. incl. tables.
(Rept. no. FTDM-2245)
(Contract AF 33(657)7248)
Unclassified report

DESCRIPTORS: *Textiles, *Reinforcing materials, *Rubber coatings, Seals, Rubber, Wire, Tests, Specifications, Mechanical properties, Physical properties, Flames, Wings.

AD-287 823 Div. 14
(TISTM/TCG) OTS price $1.10

General Dynamics/Fort Worth, Tex.
MATERIAL - 500 F POTTING COMPOUND - EVALUATION OF.
Test data memo.,
by J. W. Swain. 26 Oct 62, 6p. incl. tables.
(Rept. no. FTDM 2353)
(Contract AF 33(657)7248)
Unclassified report

DESCRIPTORS: *Silicones, *Synthetic rubber, *Embedding substances, Electrical properties, Dielectric properties, Vulcanization.

The following electrical properties on 3 room temperature vulcanizing (RTV) silicone rubber potting compounds were determined: (1) the dielectric constant and dissipation factor at 77 F at one kilocycle and one megacycle; and (2) the dielectric constant and loss tangent at 77 and 500 F at one kilomegacycle. (Author)

AD-287 824 Div. 14
(TISTM/TCG) OTS price $1.10

General Dynamics/Fort Worth, Tex.
MATERIAL - FAB 264 (FABREEKA) - LOAD DEFLECTION CHARACTERISTICS OF.
Test data memo.,
by R. L. Jones. 26 Oct 62, 3p. incl. illus.
(Rept. no. FTDM-2573)
(Contract AF 33(657)7248)
Unclassified report

DESCRIPTORS: *Synthetic rubber, *Textiles, *Load distribution, *Deflection, Synthetic fibers, Tensiometers, Tests.

The load-deflection characteristics of Fab 264 (a multiple layered cloth impregnated with rubber, nominal thickness 15 by 64 in), were determined at room temperature and 0 F. The material behaves differently when rapidly loaded. Its indicated stiffness increased as the load rate increased judging from the increase in steapness of the fast loaded load-deflection curve. Comparing the curves obtained at room temperature to those obtained at 0 F, no significant difference could be noted for either the slow or fast loaded specimens. The room temperature curves for specimens 1 and 6 at a slow load rate are considered more representative than that obtained for specimen 2, since specimen 2 had been preloaded during set-up in the test machine. CONCLUSIONS: Empirical data are provided by this memorandum and no conclusions were intended. (Author)

AD-287 826 Div. 14
(TISTM/BRW) OTS price $2.60

General Dynamics/Fort Worth, Tex.
EFFECT OF INORGANIC FILLERS ON COEFFICIENT OF THERMAL EXPANSION OF POLYMERIC MATERIALS,
by J. P. Thomas. 22 Dec 60, 24p. incl. illus. table, 3 refs. (Rept. no. FGT-2713)
(Contract AF 33(657)7248)
Unclassified report

DESCRIPTORS: *Polymers, Plastics, Epoxy resins, Mixtures, Inorganic substances, Aluminum, Silicones, Aluminum compounds, Oxides, Lithium compounds, Silicates, Titanium compounds, Dioxides, Calcium compounds, Carbonates, Powder metals, Additives, Thermal expansion.

The thermal expansion of a cured polymer-filler system may be predicted from the coefficients of thermal expansion of its constituents by a modification of the mixture rule. The mixture rule formula, (Bruggeman, D. G., Ann. Phys. 29:160(1937)) however, fails to take into account particle configuration and the relaxation processes in the polymer matrix, but seems to be adequate for many applications. (Author)

AD-287 844 Div. 14
(TISTM/TCG) OTS price $1.60

Rubber Lab., Mare Island Naval Shipyard, Vallejo, Calif.
PRELIMINARY EVALUATION OF MONSANTO VIBRATION DAMPING TREATMENT MRC-064,
by B. V. Howell. 1 Nov 62, 4p. illus. 4 refs.
(Rept. no. 94-42)
(Proj. S-F013-13-01)
Unclassified report

DESCRIPTORS: *Damping, *Plastics, *Ship hulls, *Submarine hulls, Graphite, Polymers, Vinyl chlorides, Vinyl radicals, Acetates, Bonding, Steel, Fire resistant coatings, Epoxy resins, Plastic coatings, Coatings.

In connection with the development of damping treatments for new construction submarines and surface ships an evaluation of the damping properties of the latest treatment, identified as MRC-OG4, a graphite filled copolymer of vinyl-chloride and vinyl-acetate was made. MRC-OG4 is flame-resistant and thermoplastic and can be calendered and plied up to the desired thickness without molding. The damping characteristics of 0.57-in. thick slabs of modified MRC-OG4, bonded to 3/8-in. steel bars with an epoxy adhesive, were measured at 30 to 80 F over the frequency range of about 0.5 to about 13 kcps. The results obtained indicate that the treatment has damping greater than 3% of critical at all temperatures except at 30 and 35 F in the frequency range of about 0.5 to 6 kcps. (Author)

15. MATHEMATICS

AD-286 955 Div. 15
(TISTP/GRW) OTS price $2.60

Kansas U., Lawrence.
ON FUNCTIONS ANALYTIC IN THE UPPER HALF-PLANE.
Report on Studies in Eigenvalue Problems,
by N. Aronszajn and W. F. Donoghue, Jr. June 62, 20p. (Technical rept. no. 27)
(Contract Nonr-58304)
Unclassified report

DESCRIPTORS: *Functions.

AD-287 114 Div. 15, 2
(TISTP/MS) OTS price $2.60

RAND Corp., Santa Monica, Calif.
UNIQUENESS PROBLEMS IN THE MATHEMATICS OF MULTIPLE SCATTERING,
by T. W. Mullikin. Oct 62, 16p. 14 refs. (Memo. no. RM-3221-1-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

Presented at the Interdisciplinary Conference on Electromagnetic Scattering, Clarkson College, 13-15 Aug 1962, Potsdam, N. Y.

DESCRIPTORS: *Cosmic rays, *Scattering, *Atmosphere, Intensity, Electromagnetic wave reflections, Transmission, Polynomials, Nonlinear differential equations, Equations, Theory, Functions, Integral equations, Series, Mathematical analysis, Differential equations.

Some recent mathematical studies concerning the uniqueness of solutions to Chandrasekhar's mathematical formulation of principles of invariance in the theory of radiative transfer are reported. It is shown that the X and Y equations and the psi(m) sub 1 and phi(m) sub 1 equations of Chandrasekhar have a multiplicity of solutions for many phase functions describing local scattering, the extent of this nonuniqueness having been only partially explored by Chandrasekhar. The desired solution to the X and Y equations is selected by imposing two additional linear constraints, which differ in the conservative case from those imposed by Chandrasekhar. An extension will later be made of these results to the psi(m) sub 1 and phi(m) sub 1 equations. A new formulation of all this theory is being worked out in terms of linear equations which are particularly well suited to numerical computation for thick atmospheres. (Author)

AD-287 460 Div. 15
(TISTB/LMH) OTS price $8.10

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
ADAPTIVE DECISION PROCESSES,
by Jack Lee Rosenfeld. 27 Sep 62, 82p. incl. illus. table, 34 refs. (Technical rept. no. 403)
(Contract DA 36-039-sc-78108, Proj. 3-99-00-000 and Grant DA-SIG-36-039-61-G14)
Unclassified report

DESCRIPTORS: *Games theory, *Probability, *Decision making, Inequalities, Statistical analysis, Matrix algebra, Operations research, Statistical distributions, Mathematical prediction.

General adaptive processes are described. In these processes a measure of performance is increased as the experimenter gathers more information; the actions taken by the experimenter determine both the profit and the type of information gathered. In particular, the adaptive decision process is a two-person, zero-sum, m X n game with some unknown payoffs. This game is played repeatedly. The true values of the unknown payoffs are learned only during those plays of the game at which the unknown payoffs are received. The players are given a priori probability distributions for the values of the unknown payoffs. A measure of performance is defined for the players of adaptive decision processes. An optimum strategy for one player is derived for the case in which the opponent uses one mixed strategy, known to the player, repeatedly. Optimum minimax strategies for both players are derived for the case in which the players are given the same information about the unknown payoffs. An optimum strategy, from a restricted class of strategies, is derived for one player when he is playing against nature, which is assumed to be an opponent whose strategy is unknown but is unfavorable to the player. (Author)

AD-287 478 Div. 15
(TISTP/TL) OTS price $2.60

Institute of Mathematical Sciences, New York U., N. Y.
COMPLETE CLASS THEOREMS FOR UNBIASED ESTIMATION,
by Eugene M. Laska. Aug 62, 19p. 9 refs. (Rept. no. IMM-NYU-302)
(Contract Nonr-28538)
Unclassified report

DESCRIPTORS: Statistical functions, Statistical distribution, Equations, Density, Convex sets, Integrals, Inequalities, Probability.

Let f(x, theta) be a given density function continuous in theta, theta epsilon omega, where omega is a compact subset of the real line. Let D be the class of randomized unbiased estimators, delta(x), of theta. For squared error loss function, the class of Bayes solutions is shown to be essentially complete relative to D. If omega is convex then every purely randomized delta(x) is inadmissible since by the Rao-Blackwell theorem epsilon delta (X)) has smaller risk. A theorem of Stein concerning locally best unbiased estimators is generalized to provide conditions for uniqueness (and therefore admissibility) of Bayes solutions and functional equations for their

determination. If the uniqueness condition is satisfied, then the above class is a complete class of admissible unbiased estimators. (Author)

AD-287 569 Div. 15
(TISTP/TL) OTS price $1.60

Rutgers U., New Brunswick, N. J.
BIVARIATE ACCEPTANCE SAMPLING PROCEDURES FOR GENERAL SPECIFICATION ELLIPSES,
by Melvin F. Shakun. Oct 62, 12p. incl. illus. 5 refs. (Technical rept. no. A-3)
(Contract DA 30-069-ORD-3338)
Unclassified report

DESCRIPTORS: *Ellipsoids, *Sampling, *Population, *Statistical distributions, Statistical functions, Matrix algebra, Real variables, Numerical analysis, Probability, Transformations (Mathematics), Tables.

Acceptance sampling procedures are developed for the case where two related quality variables have a bivariate normal distribution with known covariance matrix and where a specification region may be set in the form of an ellipse. The shape and orientation of this ellipse may be perfectly general. Thus the paper extends other work by the author on the so-called 'natural' specification ellipse -- one whose shape and orientation is governed by the covariance matrix of the quality variables. In this situation -- that of the general specification ellipse -- the operating characteristic curve is not unique under the procedures developed. Rather a band of O.C. curves results on the basis of which it is possible to control risks. A numerical example is given which illustrates the technique of designing single sampling plans by variables for fraction defective. (Author)

AD-287 626 Div. 15, 2
(TISTP/GRW) OTS price $1.60

Brown U. Div. of Applied Mathematics, Providence, R. I.
ASYMPTOTIC BORE DEVELOPMENT ON BEACHES OF NON-UNIFORM SLOPE,
by M. C. Shen and R. E. Meyer. Oct 62, 13p. incl. illus. 3 refs. (Technical rept. no. 2)
(Contract Nonr-562(34), Proj. NR-083-167)
Unclassified report

DESCRIPTORS: *Beaches, *Wave analysis, *Harmonic analysis, Particles, Motion, Partial differential equations.

The investigation of the shoreward travel of a bore into water at rest is extended to beaches of non-uniform slope. It is shown that the shore singularity established in the earlier investigation furnishes again an approximate solution. The shape of the beach, like the shape of the wave forming the bore, is found to influence the bore development close to the shore almost only through the basic velocity scale of the bore. (Author)

AD-287 635 Div. 15
(TISTP/GRW) OTS price $2.60

California U., Los Angeles.
ON SUCCESSIVE APPROXIMATIONS TO LYAPUNOV FUNCTIONS IN CONTROL OPTIMIZATION PROBLEMS,
by Masanao Aoki. Oct 62, 21p. 10 refs. (Rept. no. 62-50)
(Contract Nonr-233(52))
Unclassified report

DESCRIPTORS: *Functions, *Control systems, Partial differential equations, Inequalities, Sequences, Equations.

An optimization problem is considered where it is desired to minimize a time integral of a function of state and control variables over a finite control period, while bringing the system to the origin in time. An algorithm to successively optimize the control system by constructing a sequence of approximations to a Lyapunov function is proposed under certain analyticity conditions on the control dynamic equation and the criterion function. By this algorithm, nonlinear control optimization problems are reformulated as a sequence of control optimization problems with linear differential equations. The convergence of the algorithm is proved. By assigning specific form to the criterion function, many optimization problems can be treated and approximate solutions can be obtained. (Author)

AD-287 726 Div. 15
(TISTW/RD) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE DISSIPATIVITY OF A CERTAIN NONLINEAR SYSTEM OF DIFFERENTIAL EQUATIONS, I,
by B. P. Demidovich. 29 Aug 62, 11p. 5 refs. (Trans. no. FTD-TT-62-1149 from Vestnik Moskovskogo Universiteta, Seriya I, Matematika, Mekhanika, 6, pp. 19-27, 1961)
Unclassified report

DESCRIPTORS: *Nonlinear systems, *Differential equations, USSR.

AD-287 775 Div. 15
(TISTP/GRW) OTS price $6.60

Pisa U. (Italy).
ALGEBRAIC DEPENDENCE THEOREMS ON COMPLEX PSEUDOCONCAVE SPACES (Dependance algebrique et fonctions meromorphes sur les espaces pseudoconcaves),
by A. Andreotti. 1 Sep 62, 69p. 13 refs. (Technical note no. 1)
(Grant AF EOAR 62-35)
Unclassified report

French text.

DESCRIPTORS: *Functions, *Topology.

The notion of pseudoconcave space is introduced and classical theorems on algebraic dependence of meromorphic functions are extended for this new class of spaces and for sections in a coherent sheaf. (Author)

16. MEDICAL SCIENCES

AD-286 906 Div. 16, 20
(TISTB/LMH) OTS price $1.10

Pennsylvania U. School of Medicine, Philadelphia.
VISUAL PERCEPTION.
Final rept., Jan 60-Mar 62,
by John Lott Brown. Sep 62, 4p.
(Contract Nonr-551(39))
Unclassified report

DESCRIPTORS: *Eye, *Visual perception, *Radiation injuries, Retina, Laboratory animals, Blindness, Countermeasures, Flash burns.

A summary of project activities on flashblindness, spectral and temporal responses characteristic of the visual system, and animal studies of visual responses.

Division 16 - MEDICAL SCIENCES

AD-286 930 Div. 16, 32
(TISTB/LMH) OTS price $21.00

Space Technology Labs., Inc., Redondo Beach, Calif.
PHYSIOLOGICAL AND PSYCHOLOGICAL EFFECTS OF SPACE FLIGHT: A BIBLIOGRAPHY. VOLUME I. ACCELERATION, DECELERATION, AND IMPACT,
by J. F. Price. Oct 62, 1v. (Rept. no. 9990-6302-KU-000; Research bibliography no. 43)
Unclassified report

DESCRIPTORS: *Space flight, *Bibliography, *Acceleration tolerance, *Acceleration, *Deceleration, Weightlessness, Space medicine, Stress (Physiology), Stress (Psychology), Impact shock, Man.

AD-286 950 Div. 16
(TISTB/SAT) OTS price $3.60

Geological Survey, Washington, D. C.
A RECONNAISSANCE STUDY OF ANIONIC SURFACTANTS IN GROUND WATER.
Report on a Study of Detergent Pollution in Ground Water.
1 May 59, 34p. incl. illus. tables.
(FHA rept. no. 2721) Unclassified report

DESCRIPTORS: *Water, *Detergents, Sulfonates, Foams, Taste, Odors, Impurities.

AD-286 956 Div. 16
(TISTP/CCH) OTS price $1.10

Mississippi U. School of Medicine, Jackson.
PHARMACOLOGICAL STUDY ON CENTRAL SYNAPTIC SYSTEMS AFFECTING MOTOR FUNCTION.
Semi-annual progress rept., 1 Apr-31 Aug 62,
by Samuel D. Anderson and William C. Holland.
1 Oct 62, 2p.
(Contract DA 18-108-405-cml-749)
Unclassified report

DESCRIPTORS: *Muscle relaxants, *Brain, Pharmacology, Dosage, Acridines, Amines, Oxidases, Attitudes, Metabolism inhibitors, Physostigmine, Neuromuscular transmission.

A series of compounds with known activity in regard to their actions on synaptic reflexes and the central nervous system were investigated. Agents that are skeletal muscle relaxants act by depressing or interrupting transmission of nerve impulses through polysynaptic pathways. Included in this group of compounds are zoxazolamine and mephenesin. These agents also act on brain stem and subcortical areas. They have no direct effect on myoneural junction and, in lower concentration, no effect on monosynaptic pathways. The muscle relaxant properties of a number of compounds were studied. In addition to their effects on neuro-muscular activity, these substances also have pronounced effects on the central nervous system, as evidenced by increased respiratory rate, changes in temperament, and pubil size. In continuing these studies, we have confined our attention to the CNS effects of one particular substance, Compound No. 6. Attempts were made to screen possible antagonists. The possible antagonistic actions of tetrahydroamino acridine (THA) and physostigmine sulfate were studied in detail. (Author)

AD-287 007 Div. 16, 20
(TISTB/CCH) OTS price $1.10

Cornell U., Ithaca, N. Y.
COMPONENTS OF IONIZED IRRADIATED MEATS INJURIOUS TO REPRODUCTION.
Progress rept.,
by C. M. McCay, A. C. Stevens, and J. K. Loosli.
15 July 62, 3p. incl. tables.
(Contract DA 49-007-md-600)
Unclassified report

DESCRIPTORS: *Radiation effects, *Food, *Reproductive system, Nutrition, Growth, Reproduction, Diet, Meats.

During the first reproductive cycle females fed the control beef diet showed slightly better performance by all measures than those fed irradiated beef and they weaned more live pups. The differences are not large and may disappear as the experiment progresses. Some of the females were bred and whelped a second time and others are expected soon. No differences in general health are evident to date, and no anatomical abnormalities were seen among stillborn pups. After one year of age the males on the experimental diets were checked for sperm production and characteristics, and were used for breeding with non-experimental females in the kennel to check their breeding behavior and fertility. To date, 1 of 4 male dogs on each diet has exhibited abnormally low sperm counts, and one male on irradiated beef, while showing normal sperm counts and mobility, has refused to mate. These 3 dogs may become normal with more maturity. No important dietary distinction is indicated at present. (Author)

AD-287 016 Div. 16
(TISTB/CCH) OTS price $1.10

Armed Forces Inst. of Pathology, Army Medical Center, Washington, D. C.
RADIATION AND STERILIZATION FOODS.
Progress rept. for period ending 15 Mar 62,
by M. A. Ross, F. M. Garner, and W. E. Tucker, Jr.
15 Mar 62, 3p.
(Proj. 6x60-01-001-02)
Unclassified report

DESCRIPTORS: *Food, *Radiation effects, Decontamination, Laboratory animals, Diet, Histology, Experimental data.

AD-287 031 Div. 16
(TISTB/MD) OTS price $1.10

Miami U. Coral Gables, Fla. School of Medicine.
MOUSE CARCINOGENICITY STUDY.
Progress rept., 1 Mar 57-15 Mar 62,
by William B. Deichmann and J. L. Radomski.
15 Mar 62, 10p. tables.
(Contract DA 49-007-md-789)
Unclassified report

DESCRIPTORS: *Food, *Cancer, *Radiation effects, Laboratory animals, Preservation.

Four strains of mice are being fed a mixture of irradiated foods for the duration of their lives to determine whether foods sterilized by irradiation are likely to be carcinogenic. To date, histopathological examinations have revealed no indications of a significant increase in tumor incidence.

AD-287 064 Div. 16, 20
(TISTB/CCH) OTS price $2.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
EFFECTS OF CHRONIC LOW-LEVEL IRRADIATION ON MICE,
by Loren D. Carlson, Leo K. Bustad and others.
Jan 62, 21p. incl. illus. tables, 10 refs.
(Rept. no. 61-5)
Unclassified report

DESCRIPTORS: *Radiation effects, Laboratory animals, Oxygen consumption, Cobalt, Mice, Dose rate, Stress (Physiology), Radiation instruments, Physiology.

A facility for low-level irradiation with a Co60 source is described. Mice were irradiated at 0.01 r/hr. and 0.2 r/hr. for 8 hours of the day for 100 and 200 days. Following a challenge dose of irradiation of 50 r and 300 r, studies of weight, oxygen consumption, lymphocyte number, LD50/15, and response to heat stress failed to show physiologic changes that might be related to a repair phenomenon or might differentiate the preirradiated animals from the control animals. (Author)

AD-287 065 Div. 16
(TISTB/SAT) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
EFFECTS OF INTRAVASCULAR HEMOLYSIS ON THE SPECIFIC ACTIVITY OF IRON-CONTAINING FRACTIONS OF RAT BLOOD,
by Thomas P. Leffingwell, George S. Melville, Jr. and Robert W. Riess. Mar 62, 7p. incl. illus. table, 18 refs. (Rept. no. 61-35)
(In cooperation with University of Texas, Austin)
Unclassified report

DESCRIPTORS: *Hydrazines, *Blood proteins, *Phenyl radicals, Serum, Erythrocytes, Iron, Blood chemistry, Electrophoresis.

Intravascular hemolysis was induced by injecting phenylhydrazine.HCl into rats which had received an intracardial injection of $Fe^{59}Cl_3$ in physiologic saline 168 hours earlier. At 24 hours after the phenylhydrazine injection the rats were sacrificed by exsanguination. Both stable iron and radioiron were analyzed in the residual blood cells, intact serum, and iron-containing serum fractions. Data were treated statistically. Results indicate that, whereas the specific activity of one of the iron-containing serum fractions does not exhibit the linear functions which characterize several other components of whole blood, it may reflect a dynamic equilibrium between erythrogenesis and cell catabolism. The ability to make such a distinction would be of great value in work with irradiated animals, and in other erythrogenic dyscrasias. (Author)

AD-287 066 Div. 16, 20
(TISTB/CCH) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
EFFECTS OF RADIATIONS OF DIFFERENT LET ON ARTEMIA EGGS,
by Stephen S. Easter, Jr. and Franklin Hutchinson. Mar 62, 7p. incl. illus. table, 12 refs. (Rept. no. 61-83)
Unclassified report

DESCRIPTORS: *Eggs, *Radiation effects, Shellfish, Gamma rays, Dose rate, Cobalt, Ions, Viability, Electrons.

Eggs of the brine shrimp Artemia salina were irradiated in the dry state and after being soaked in water for various times with gamma rays, 1 Mev electrons, and ions of He, C, O, and A with an energy of 10 Mev/nucleon. Sigmoidal survival curves with a multiplicity of the order of 60 are found for irradiation with gamma rays and electrons. The survival curves are changed to exponential ones for irradiation with the heavy ions, the transition for dry eggs occurring between He and C ions. For the heaviest ions, the effective cross section per ion approaches a maximum value the order of 0.15 microns squared. Soaking the eggs in sea water for times up to 25 hours decreases the survival with heavy ions only a little, but drastically changes the sigmoidal survival curve for electrons, reducing the multiplicity from about 60 to about 4. These changes on soaking are about the same at 6 hours and at 24 hours. (Author)

AD-287 067 Div. 16, 20
(TISTB/CCH) OTS price $2.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
CHROMOSOMAL STUDIES ON IRRADIATED LEUKOCYTES IN VITRO,
by Y. Ohnuki, A. Awa, and C. M. Pomerat. Dec 61, 21p. incl. illus. tables, 28 refs. (Rept. no. 61-104)
Unclassified report

DESCRIPTORS: *Leukocytes, *Radiation effects, Chromosomes, Heparin, Hemagglutins, Cobalt, X-rays, Gamma rays, Histology.

The technic for cultivation of the human buffy coat with heparinized venous blood treated with phytohemagglutinin was described. By this method chromosome spreads were made from 6-day cultures, using the colchicine-hypotonic, sodium citrate-acetic, orcein-squash sequence. The range of polyploidy was determined on 2 specimens from each of 3 individuals (2 males and 1 female). Detailed analyses and counts of human chromosomes indicated the predominant distribution to be euploid cells having 46 chromosomes. Idiogram studies showed the same basic pattern demonstrated by previous investigators. These data served as a basis for comparing results obtained from sister cultures irradiated with 400 r from a cobalt-60 source on the fourth day and fixed on the sixth day. There was a considerable increase, 6.3 percent, in the number of polyploid cells. Among these, tetraploid cells were the most frequent, being 5.4 percent. By chromosomal analyses, 56.6 percent of the cells were found to be damaged. Most injuries were due to chromosomal breakages, especially fragments and dicentrics. Endoreduplication was noted frequently. (Author)

AD-287 068 Div. 16
(TISTB/SAT) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
HYPODYNAMIC UROLITHIASIS: A POTENTIAL HAZARD DURING PROLONGED WEIGHTLESSNESS IN SPACE TRAVEL,
by Abraham T. K. Cockett, Cecil C. Beehler and James E. Roberts. Dec 61, 6p. incl. illus. 10 refs. (Review no. 2-62)
Unclassified report

DESCRIPTORS: *Space medicine, *Weightlessness, Calcification, Calcium, Diet, Vitamin D, Hazards, Kidney stones, Pathology.

Hypodynamic urolithiasis as a hazard in space travel is discussed in the light of present-day knowledge. Emphasis was placed on several etiologic factors in urinary lithiasis that will be present during space flight. Moreover, as urinary stones may be formed during prolonged space travel, prophylactic measures (physical exercises, diet and schedules) are suggested for the prevention of stone formation. (Author)

AD-287 069 Div. 16
(TISTB/CCH) OTS price $2.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
A CLINICAL CLASSIFICATION OF VERTIGO,

by Joseph A. Furey and Ralph N. Kraus. Apr 62, 22p. 22 refs. (Review no. 7-61)
Unclassified report

DESCRIPTORS: *Vertigo, Aviation medicine, Epidemiology, Ear, Literature.

A comprehensive survey of the literature on the clinical entities epidemic vertigo, acute toxic labyrinthitis, atypical Meniere's disease, and pseudo-Meniere's syndrome was made. Although these 5 syndromes have more similar than dissimilar characteristics, slight differences are pointed out. A review of 25 consultation patients for single or recurrent episodes of vertigo without significant cochlear involvement is presented. Finally, a clinical classification which offers promise is suggested. This classification system is based on anatomic location, not etiology, and is similar to Lederer's localization of facial nerve lesions by presenting symptoms. It classifies vertigo as that produced by: (1) peripheral vestibulopathy, a term devised for involvement of the peripheral anatomic portions of the vestibular system; (2) central vestibulopathy, an involvement of the retrolabyrinthine central anatomic areas of the vestibular system; (3) idiopathic vestibulopathy, in which vertigo is produced by either an unknown cause or, in the case of postural vertigo, by involvement of either the central or peripheral regions. As a catchall term, the use of idiopathic vestibulopathy or idiopathic vertigo is recommended. (Author)

AD-287 070 Div. 16
(TISTB/CCH) OTS price $1.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
COMPARATIVE EVALUATION OF SOME AUDITORY MEASURES,
by James Jerger. Apr 62, 14p. incl. tables, 16 refs. (Rept. no. 62-26)
Unclassified report

DESCRIPTORS: *Auditory thresholds, *Audiometry, Hearing, Reliability, Audiometers, Speech, Tests, Analysis.

A battery of auditory tests was administered to a group of 27 patients with sensorineural hearing loss and once to 30 normal listeners. The battery included conventional air- and bone-conduction audiograms, speech threshold and discrimination tests, Bekesy audiograms for sweep and fixed frequency, and TDT and SISI tests. Indices of both absolute and relative consistency were computed for each measure from the test-retest data. Each measure was evaluated in terms of these indices, as well as in terms of its efficiency, in differentiating between individuals with normal hearing and those with sensorineural hearing loss. (Author)

AD-287 072 Div. 16
(TISTB/MD) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
A MODIFIED CARBONATE-PHOSPHOTUNGSTATE METHOD ADAPTED FOR THE DETERMINATION OF URIC ACID IN RAT URINE,
by Arthur E. Gass, Jr. and Kathryn S. Conkle. Feb 62, 5p. incl. illus. table, 8 refs. (Rept. no. 62-33)
Unclassified report

DESCRIPTORS: *Uric acid, Spectrophotometers, Urine, Laboratory animals, Determination.

An adaptation and modification of the carbonate-phosphotungstate technic for the determination of uric acid in rat urine is described. n-Ethylmaleimide is used to minimize the interfering effect of nonuric acid chromogens that contain sulfhydryl groups. Furthermore, an internal standard was incorporated to bring the uric acid values found in rat urine into an optimum range for spectrophotometric analysis. Several parameters of the basic technic were examined. Reaction mixture curves that were run on the Beckman DK-2 spectrophotometer establish maximum color development at 15 to 20 minutes, stability to 30 minutes, and an absorbence peak at 710 millimicrons. The noninterference of n-ethylmaleimide was demonstrated. Normal nonfasting values for rat urinary uric acid were found to be 2.17 mg./day ± 0.76 mg. (Author)

AD-287 073 Div. 16
(TISTB/CCH) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
DESTRUCTION OF CHIMPANZEE KIDNEY CELLS BY SERA FROM PATIENTS WITH ACUTE INFECTIOUS HEPATITIS,
by William D. Hillis. Dec 61, 5p. incl. illus, table, 12 refs. (Rept. no. 62-34)
Unclassified report

DESCRIPTORS: *Hepatitis, *Disease carriers, Serum, Kidney, Pathology, Cells (Biology), Primates, Laboratory animals, Epidemiology, Man.

Destruction of chimpanzee kidney cells by 2 of 12 acute sera from patients with clinical infectious hepatitis was noted. The cellular effect has been seen in serial passage. The destructive agents, tentatively named SAM-1 and SAM-2, have been shown in fluorescent antibody and neutralization tests to be serologically cross-reactive with convalescent serum derived from clinical infectious hapatitis. The agents are resistant to heat treatment at 56 C. for 30 minutes. (Author)

AD-287 074 Div. 16
(TISTB/MD) OTS price $1.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
EFFECT OF RESERPINE ON BODY TEMPERATURE REGULATION OF THE RAT,
by Robert E. Taylor, Jr. and Melvin J. Fregly. Feb 62, 9p. incl. illus. tables, 19 refs. (Rept. no. 62-37)
Unclassified report

DESCRIPTORS: *Reserpine, *Thyroxine, *Body temperature, Pituitary hormones, Heat production, Exposure, Laboratory animals, Oxygen consumption.

Daily intraperitoneal injections of reserpine were found to lower the colonic temperature of rats maintained at room temperature (25 C.) only if the dose was 1.0 mg./kg. or greater. Much smaller doses (0.125 mg./kg.) of the drug significantly increased the rate at which these animals cooled when exposed to reduced environmental temperatures (5 and 14 C.). Metabolic studies indicated that decreased heat production rather than increased heat loss was the mechanism whereby reserpine exerted its effect on cooling rate. Physiologic doses of thyroxine (50 micrograms/kg.) were found to improve the metabolic response of reserpine-treated rats to cold and to return their cooling rates toward control values. TSH (thyroid stimulating hormone) administration to reserpine-treated rats did not improve their response to cold. These observations suggested that reserpine may interfere with the normal response of the thyroid gland to stimulation by TSH, but not to peripheral utilization of thyroid hormone. (Author)

AD-287 075 Div. 16
(TISTB/MD) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
ADDITIVE EFFECTS OF ACETAZOLAMIDE AND FAT EMULSION ON THE A-a P(CO2) DIFFERENCE,
by Stephen M. Cain. Apr 62, 4p. incl. illus. tables, 6 refs. (Rept. no. 62-38)
Unclassified report

DESCRIPTORS: *Carbon dioxide, *Carbonic anhydrase, *Fats, Cottonseed oil, Lungs, Blood, Arteries, Laboratory animals, Diuretcs, Excretion, Inhibition.

Alveolar and arterial gas tensions (P) were measured in anesthetized dogs during a control period, after intravenous injections of a carbonic anhydrase inhibitor, and after rapid intravenous infusion of fat emulsion. The alveolar-arterial (A-a) P(CO2) difference increased from about 6 mm. Hg during the control period to 26 mm. Hg after carbonic anhydrase inhibition. A further increase took place after fat emulsion when the A-a P(CO2) difference averaged 35 mm. Hg. There was no increase in the A-a P(O2) difference between carbonic anhydrase inhibition and fat emulsion. The additive increase in the A-a P(CO2) difference strongly suggested that fat emulsion did not further interfere with the interconversion of CO2 and bicarbonate. (Author)

AD-287 076 Div. 16, 20
(TISTB/CCH) OTS price $1.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
A STUDY OF THE EFFECT OF INTERMITTENT LOW-LEVEL Co(60) GAMMA IRRADIATION ON HEMOPOIESIS IN THE MONKEY (MACACA MULATTA),
by Robert J. Young, Betty J. Joseph, and Richard M. Ritter. June 62, 12p. incl. illus. table, 15 refs. (Rept. no. 62-51)
Unclassified report

DESCRIPTORS: *Radiation effects, *Radioactive isotopes, *Hemopoiesis, Cobalt, Gamma rays, Primates, Laboratory animals, Physiology.

The effect on hematopoiesis of intercurrent stress imposed immediately preceding radiation has been investigated in the monkey. Three groups of Macaca mulatta monkeys were exposed to 200 r, 100 r, and 50 r of whole-body radiation. The irradiation was repeated four times at 80-day intervals. The animals received an additional stress in the form of a phlebotomy (approximately 40 percent of the blood volume being removed) immediately before radiation. A fourth group of animals was phlebotomized and served as non-irradiated controls. The impairment and subsequent recovery of the bone marrow were assessed by means of Fe59 uptake and repeated hematograms. (Author)

AD-287 077 Div. 16
(TISTB/MD) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
PYRIDOXAL PHOSPHATE HYDRAZONE AS A MEASURE OF 1,1-DIMETHYLHYDRAZINE CONCENTRATION IN TISSUES,
by Miguel A. Medina, Hugh D. Braymer, and Johnie L. Reeves. Feb 62, 4p. incl. illus. table, 7 refs. (Rept. no. 62-54)
Unclassified report

DESCRIPTORS: *Methyl hydrazines, *Pyridoxine, Laboratory animals, Tissues (Biology), Brain, Spectrophotometers, Determination.

a method is described for determining concentrations of 1,1-dimethylhydrazine (UDMH) in tissues. It is based on the spectral absorption of pyridoxal phosphate-UDMH hydrazone. By use of the described method, brain UDMH levels were determined in two groups of rats. Both groups received 120 mg./kg. UDMH; one received additionally 100 mg./kg. pyridoxine hydrochloride. There were no apparent differences in the two groups either in the level of accumulating the hydrazide or in the rate of clearing it. (Author)

AD-287 078 Div. 16
(TISTB/CCH) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
PREVENTION OF AIRSICKNESS WITH MEPROBAMATE,
by J. J. Franks, Lawrence J. Milch, and Elmer V. Dahl. Feb 62, 3p. incl. table, 17 refs. (Rept. no. 62-56)
Unclassified report

DESCRIPTORS: *Tranquilizing drugs, Motion sickness, Carbamates, Autonomic nervous system, Countermeasures, Alkaloids.

Meprobamate, a mild tranquilizer, was tested alone and with meclizine as an airsickness preventive in a study involving 441 volunteers. Meprobamate was found to be as effective as meclizine, but a combination of the two drugs was no better than either drug alone. (Author)

AD-287 079 Div. 16
(TISTB/CCH) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
STRESS IN DENTAL PATIENTS. SERUM AND URINE 17-HYDROXYCORTICOSTEROID RESPONSES IN IMPACTION PATIENTS,
by Ira L. Shannon, Lucian Szmyd, and John R. Prigmore. Apr 62, 5p. incl. illus. 25 refs. (Rept. no. 62-59)
Unclassified report

DESCRIPTORS: *Corticosteroids, *Dental surgery, Serum, Urine, Stress (Physiology), Stress (Psychology).

A total of 91 impacted lower third molars was removed and patient adrenocortical response, both before and after surgery, was measured. Both serum free and urine total 17-hydroxycorticosteroids were determined in these patients and in 33 control subjects. The preoperative serum mean of 20.68 gamma percent for the surgery patients was significantly higher than that of 14.17 gamma percent found for the controls. It was also significantly higher than the 13.74 gamma percent found for our 633 laboratory control subjects and the 17.53 gamma percent for 286 subjects scheduled for simple exodontia. One hour after operation the effect of anticipating and experiencing impaction surgery was no longer evident. Urinary excretion of corticosteroids was not significantly different for the impaction and control groups. (Author)

AD-287 080 Div. 16
(TISTB/CCH) OTS price $4.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
BIOLOGIC SYSTEMS OF DISCOVERER SATELLITES XXIX AND XXX,
ed. by John E. Prince. Apr 62, 49p. incl. illus. tables, refs. (Rept. no. 62-62)
Unclassified report

DESCRIPTORS: *Space flight, *Space medicine, Radiation tolerance, Algae, Bacteria, Spores, Viruses, Blood proteins, Satellites, Growth, Biology.

Contents:
Radiation levels in the biopack
Dosimetry: technics and ranges
Heavy primary particles
Organ and tissue cultures
Embryonic chick heart and human cell cultures
Ciliary activity of embryonic chick choroid plexus
Bacterial spores
Physiologic changes observed in Clostridium Sporogenes
Algae
Growth of photosynthetic microorganisms following orbital space flight
Viruses
Successful orbital space flight and recovery of selected viruses
Serum protein
In vitro antigenicity of human serum albumin following orbital space flight

AD-287 081 Div. 16, 20
(TISTB/CCH) OTS price $5.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
RADIOBIOLOGIC EXPERIMENTS IN DISCOVERER SATELLITE XVII,
ed. by George W. Crawford. June 62, 50p. incl. illus. tables, refs. (Rept. no. 62-67)
Unclassified report

DESCRIPTORS: *Space flight, *Radiobiology, Scientific research, Cosmic rays, Particles, Dosimeters, Satellites, Microorganisms, Photosynthesis, Cells (Biology), Radiation effects.

Contents:
Physical description of the flight
Identification of particles and dose measurements
Physical dosimetry
Microbiologic effects of space radiations
The effect of space flights on living human cells aboard the Discoverer XVII vehicle
Effects of space flight on the in vitro combining capacity of antigen and antibody
Experiments with photosynthetic microorganisms

AD-287 083 Div. 16
(TISTB/CCH) OTS price $1.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
SOME OBSERVATIONS ON THE BEHAVIOR OF A VISUAL TARGET AND A VISUAL AFTER-IMAGE DURING PARABOLIC FLIGHT MANEUVERS,
by J. A. Roman, B. H. Warren and others.
June 62, 8p. incl. illus. tables, 6 refs. (Rept. no. SAM TDR 62-66)
(In cooperation with Naval School of Aviation Medicine, Pensacola, Fla.)
Unclassified report

DESCRIPTORS: *Space medicine, *Visual after images, Weightlessness, Visual perception, Behavior, Target recognition, Space perception.

The apparent displacement of a real target and a visual after-image were observed in the F-100F aircraft during periods of weightlessness averaging 45 seconds. A real target appears to be displaced upward from center for accelerations greater than 1 G positive, and appears to be displaced downward for accelerations less than 1 G positive. A visual after-image, when observed in the absence of a real target, appears to be displaced from center in a direction opposite to that observed for a real target. Fixating on a real target (RT) in the presence of a visual after-image (VAI) resulted in movement of both the RT and the VAI concurrently in the fashion described for a real target. Differences in interpretation of results, on the basis of the opposite direction of illusory movements using real targets and visual after-images, were resolved. (Author)

AD-287 084 Div. 16
(TISTB/CCH) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
THE AIR TURBINE IN IMPACTED THIRD MOLAR SURGERY,
by Lucian Szmyd, Ira L. Shannon and others.
May 62, 6p. incl. illus. tables, 16 refs. (Rept. no. SAM TDR 62-73)
Unclassified report

DESCRIPTORS: *Dental surgery, *Dental equipment, Corticosteroids, Teeth.

A clinical evaluation of the higher bur speed technic (air turbine) in the removal of impacted teeth was carried out on 100 mandibular third molar cases. Body fluid 17-hydroxycorticosteroid determinations were utilized as an objective measurement of patient response to stress induced by the two oral surgery technics. Findings indicated that, except for patient preference, neither procedure could be considered as the method of choice. The response of the patients to the two methods was virtually identical as indicated by both subjective and objective measurements. (Author)

AD-287 085 Div. 16
(TISTB/MD) OTS price $1.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
FURTHER STUDIES ON THE DISTRIBUTION AND METABOLISM OF 2-MERCAPTOETHYLGUANIDINE AND BIS(2-GUANIDOETHYL) DISULFIDE IN MICE,
by Bernard Shapiro, Emanuel E. Schwartz, and George Kollmann. June 62, 14p. incl. illus. tables, 7 refs. (Rept. no. SAM TDR 62-68)
(In cooperation with Albert Einstein Medical Center, Philadelphia, Pa., Contract AF 41(657)-300, Proj. 7757)
Unclassified report

DESCRIPTORS: *Radioprotective drugs, Labeled substances, Radioactive isotopes, Laboratory animals, Distribution, Tissues (Biology), Metabolic products, Determination, Chromatographic analysis, Electrophoresis, Liver, Thiols, Sulfides, Guanidines, Digestive system, Serum, Metabolism.

The distribution of S35 in the various tissues and the metabolism of 2-mercaptoethylguanidine-S-35 (MEG-S35) and bis(2-guanidoethyl)disulfide-S-35 (GED-S35) as determined by chromatography of tissue homogenates were studied in 8- to 10-week-old C57BL/6J male mice. Protein-bound S35, GED, taurocyamine, guanidoethylsulfinic acid, MEG, and sulfate were identified in the tissues. Several unknown compounds were also observed. Concentrations of protein-bound S35 and GED decreased at 120 min after GED administration and correlated best with protection of the mice. All products increased in the tissues at the higher dose of MEG, but the protein-bound S35 did not increase as much as other products. Some differences in the concentrations of products were noted on comparison of MEG-treated with GED-treated animals. The relationship of these results to mechanism of action of MEG and GED is discussed. (Author)

AD-287 087 Div. 16
(TISTB/CCH) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
FOLLOWUP OF STAPES MOBILIZATION PATIENTS,
by Lois L. Elliott and Ralph N. Kraus. June 62, 6p. incl. illus. tables (Rept. no. SAM TDR 62-75)

Unclassified report

DESCRIPTORS: *Ear, Otorhinolaryngology, Surgery.

Results of a followup procedure which obtained long-term information on 152 ears which had experienced stapes mobilization surgery are reviewed. Results show that approximately one year after surgery, 50% of the cases maintained at least a 25% improvement in hearing. Over one third of the ears maintained a 25% improvement for 3 years or longer. Preoperation hearing level, amount of improvement immediately after surgery, and sex of the patient were found to be unrelated to percent of hearing improvement. However, older patients maintained proportionately greater improvement in hearing for at least three years. Finally, there was a strong tendency for the operation to be more successful when surgery was required on only one ear than in instances when it was required on both ears. (Author)

AD-287 088 Div. 16
(TISTB/SAT) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
ENDOGENOUS BACTERIAL INVASION OF TISSUES OF MACACA MULATTA FOLLOWING LETHAL CO60 IRRADIATION,
by Anna C. Garner, E. Staten Wynne and others. June 62, 5p. incl. tables, 14 refs. (Rept. no. SAM TDR 62-77)

Unclassified report

DESCRIPTORS: *Radiation effects, *Infections, Tissues (Biology), Primates, Cobalt, Bacteria, Salmonella, Shigella.

Forty-nine macaca mulatta monkeys were sacrificed 2, 5, 8, 11, and 14 days after exposure to Co(60) gamma radiation approximating the LD50/30. Bacteriologic cultures showed only one positive blood. Bacterial invasion of the submandibular node after 14 days and of the stomach wall at all postirradiation intervals of 5 days or more was statistically significant. Of the 15 Salmonella and Shigella organisms detected in animals succumbing or sacrificed 5 or more days postirradiation, 10 were present in the stomach wall. (U)

AD-287 089 Div. 16
(TISTB/CCH) OTS price $1.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
COMBINED CHISEL - AIR TURBINE TECHNIC FOR IMPACTED MANDIBULAR THIRD MOLAR SURGERY,
by Lucian Szmyd. June 62, 8p. incl. illus. tables, 24 refs. (Rept. no. SAM TDR 62-78)

Unclassified report

DESCRIPTORS: *Dental equipment, *Dental surgery, Teeth.

The chisel and air turbine technics were combined for removal of impacted mandibular third molars. The basic steps are as follows: (1) to remove bone with the air turbine; (2) to limit use of the mallet and chisel to a single split and to use air turbine for additional sectioning of tooth; (3) before tooth is split, to remove bone adjacent to coronal element to be sectioned; (4) to use carbide bur on dentin and to use a diamond stone only when dividing tooth involving large segments of enamel. (Author)

AD-287 091 Div. 16
(TISTB/MD) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
THE EFFECT OF AN AQUEOUS STANNOUS FLUORIDE PROPHYLAXIS PASTE ON ENAMEL SOLUBILITY,
by Ira L. Shannon and Warren R. Hester. June 62, 3p. incl. tables, 3 refs. (Rept. no. SAM TDR 62-79)

Unclassified report

DESCRIPTORS: *Fluorides, *Dental research, Teeth, Dental materials, Dental caries, Preventive medicine, Inhibition, Man, Dentifrices, Tin compounds.

The in vitro effectiveness of an aqueous stannous fluoride (approximately 20%) prophylaxis paste was determined by measuring the amount of P removed from enamel surfaces both before and after treatment with the paste. Treatment reduced enamel solubility by over 90% in all experimental groups, and there was no loss of effectiveness when the paste was aged over an 8-wk period. The substitution of liquid petrolatum, or silicone and petrolatum in combination, for water did not increase effectiveness. (Author)

AD-287 092 Div. 16
(TISTB/MD) OTS price $3.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
A CRITICAL VIEW OF THE SAL TEST,
by Tom W. Tillman. Aug 62, 28p. incl. illus. table, 18 refs. (Rept. no. SAM TDR 62-96)

Unclassified report

DESCRIPTORS: *Audiometry, *Auditory perception, Sound transmission, Air, Bone, Hearing, Man, Test methods, Deafness.

The SAL test (Sensorineural Acuity Level Test) and conventional bone conduction tests were administered to two groups of subjects with sensorineural hearing losses, a group with conductive loss due to otosclerosis, and a group of normal subjects with simulated unilateral conductive hearing losses. SAL data were gathered under a conventional earphone and cushion as well as under a circumaural-type earphone. Results of the two methods for the sensorineural groups agreed closely below 1000 cps, but above this frequency SAL levels were lower (better) than bone conduction hearing levels. In the conductive loss groups, the results of the two methods agreed closely at frequencies above 1000 cps, but at lower frequencies SAL yielded markedly higher (poorer) hearing levels than did conventional bone conduction tests. The discrepancy was reduced, but not eliminated, when SAL data were collected by using the circumaural-type earphone. (Author)

AD-287 154 Div. 16
(TISTB/SAT) OTS price $5.60

Chesapeake Bay Inst., Johns Hopkins U., Annapolis, Md.
ECOLOGICAL STUDIES OF THE LARVAL DEVELOPMENT OF

RHITHROPANOPEUS HARRISII (XANTHIDAE, BRACHYURA), by N. A. Chamberlain. Aug 62, 47p. incl. illus. tables, 20 refs. (Technical rept. no. 28; Reference no. 62-18)
(Contract Nonr-2484(8), Proj. NR 104-317)
Unclassified report

DESCRIPTORS: *Crustacea, Chesapeake Bay, Algae, Salinity, Fluorometers, Growth, Culture media, Rearing, Ecology, Reproduction, Aquatic animals.

The larvae of Rhithropanopeus harrisii were successfully reared in isolation in the laboratory using copepod nauplii as the sole food source. Laboratory cultures fed this and other diets were used to examine environmental effects on the development and mortality of the larvae. Every individual successfully completing larval development went through 4 zoeal stages and one megalopa before metamorphosis to the first crab stage. Larvae exposed to both algae and nauplii developed much more slowly than those exposed to nauplii alone. Cultures maintained at 1 and 15% salinity were not successful, those at 3% salinity had high mortality, and those at 6% and 10% salinity were most successful with mortalities of 0 to 20%. Development at 30 C was found to be about twice as rapid as at 15 C at salinities where mortality was low. The results of these experiments were used in the design of a study of a natural population. A recently described tracer technique using the dye rhodamine B and highly sensitive fluorometers was employed in the estimation of exchange of water between a small embayment containing a natural population of Rhithropanopeus harrisii and outside areas in Chesapeake Bay. (Author)

AD-287 156 Div. 16
(TISTB/LMH) OTS price $3.60

Civil Aeromedical Research Inst., Oklahoma City, Okla.
DETERMINATION OF CENTERS OF GRAVITY OF MAN, by John J. Swearingen. Aug 62, 37p. incl. illus. tables, 2 refs. (Rept. no. 62-14)
Unclassified report

DESCRIPTORS: *Gravity, *Anthropometry, Medical equipment, Body, Motion, Posture, Determination, Man.

The location of the center of gravity of the adult male in various body positions and the ability to shift the c.g. voluntarily with various body motions is studied. Maximum possible shifts of the c.g. from that of an erect standing posture were found to be 11 1/2 inches toward the head, 10 inches toward the feet, 8 inches anteriorly, 4 1/2 inches posteriorly and 4 1/2 inches laterally. (Author)

AD-287 191 Div. 16
(TISTB/SAT) OTS price $1.10

Dental Research Facility, Naval Training Center, Great Lakes, Ill.
THE RELATION OF PERIODONTAL HEALTH IN NAVAL RECRUITS TO HYGIENE, PROFESSIONAL DENTAL CARE AND EDUCATION,
by William R. Shiller. May 62, 5p. incl. tables, 11 refs.
(Proj. MR005.12-5004.12)
Unclassified report

DESCRIPTORS: *Dental caries, *Diseases, Sociology, Economics, Dental research, Military personnel, Teeth,

In a study of 299 naval recruits, close relationships were found between the level of periodontal disease and the number of filled teeth, the number of decayed teeth, the hygiene index and the number of times per day that the teeth were brushed. Significant differences were found between high school graduates and nongraduates in regard to factors indicating the level of home and professional dental care. It is concluded that a high level of personal and professional dental care is closely related to reduced periodontal disease in a recruit population. (Author)

AD-287 192 Div. 16
(TISTB/SAT) OTS price $1.10

Dental Research Facility, Naval Training Center, Great Lakes, Ill.
THE HEMAGGLUTINATION-INHIBITION ACTIVITY OF HUMAN PAROTID SALIVA,
by Irving L. Shklair, Max Rosenbaum, and Frank Morrison. June 62, 4p. incl. tables, 12 refs.
(Proj. MR005.12-5004.10)
Unclassified report

DESCRIPTORS: *Saliva, *Viruses, Electrodialysis, Inhibition, Erythrocytes, Influenza viruses, Parotitis, Immunology, Hemagglutinins.

The myxoviruses which include the influenza and mumps viruses can cause the agglutination of a variety of red blood cells. This hemagglutination can take place if the virus attaches itself to the surface of a red blood cell that contains specific viral receptor sites. Such hemagglutination can be prevented, however, by the addition of nonspecific inhibitors or specific inhibitors such as viral antibodies that compete with the virus or block viral receptor sites on the red blood cells. This report is concerned with the extent of the hemagglutination-inhibition activity exhibited by parotid saliva, and whether this inhibition is due to nonspecific factors or to specific viral antibodies. (Author)

AD-287 193 Div. 16
(TISTB/MD) OTS price $1.60

Dental Research Facility, Naval Training Center, Great Lakes, Ill.
INFRARED STUDIES OF HUMAN SALIVA. IDENTIFICATION OF A FACTOR IN HUMAN SALIVA PRODUCING AN INFRARED ABSORBANCE MAXIMUM AT 4.9 MICRONS,
by Burton L. Lamberts, Thomas S. Meyer, and Helmuth H. Fuchs. June 62, 7p. incl. illus. tables, 12 refs.
(Proj. MR005.12-5004.8)
Unclassified report

Presented at the 40th General Meeting of the International Association of Dental Research, 15-18 March 1962, held in St. Louis, Missouri.

DESCRIPTORS: *Saliva, *Dental research, Man, Infrared spectrophotometers, Determination, Thiocyanates.

An absorption maximum was observed at 4.9 microns in infrared spectra of human parotid saliva. The factor causing this absorbance was found to be a dialyzable anion which was identified as thiocyanate on the basis of its solubility in ethanol and acetone, reactivity with ferric alum or ferric nitrate, and heat stability. Thiocyanate was then determined in 16 parotid saliva samples by a spectrophotometric method, which involved formation of ferric thiocyanate. The thiocyanate concentration of each sample was also estimated from the 4.9-micron absorbance

The mean results by the two methods did not differ significantly. Some limitations in the quantitative determination of thiocyanate in saliva from the 4.9-micron absorbance are discussed. The thiocyanate was not noticeably associated with the presence or absence of dental caries. (Author)

AD-287 206 Div. 16, 14
(TISTB/CCH) OTS price $2.60

Tennessee U., Knoxville.
BIOLOGIC RESPONSE TO POLYURETHANE FOAM.
Progress rept. for 31 Oct 61-31 Oct 62,
by R. T. Sherman. 31 Oct 62, 17p. incl. illus. tables, 26 refs.
(Contract DA 49-193-md-2099)
Unclassified report

DESCRIPTORS: *Expanded plastics, *Urethanes, *Transplantation, *Surgery, Laboratory animals, Labeled substances, Toxicity, Polymers.

Summary of general and specific toxicity in mice, rats, and dogs of prepolymers, catalysts, and polymerized polyurethane measured by several methods reveal the relative lack of toxicity of these compounds within the experimental framework described. Studies of C14 ring labelled polyurethane implanted into rat tibias indicate beginning mobilization from the site of implant at approximately 30 weeks post implant. Preliminary estimates of activity of visceral homogenates suggest increase in total activity over background in spot checks of homogenate of an animal at 15 months. Stools and urine of implanted rats are negative for radioactivity. Studies of specific organ activity are in progress. No evidence of carcinogenicity in rats implanted by polyurethane rods (tibia and dorsal subcutaneous) has appeared during 685 days of observation post implant. Methods of C14 tagging and sample preparation of polyurethane compounds are detailed. (Author)

AD-287 219 Div. 16, 4
(TISTB/MD) OTS price $2.60

Ohio State U. Research Foundation, Columbus.
CARBOHYDRATE DERIVATIVES FOR PROTECTION FROM RADIATION DAMAGE.
Annual rept. no. 2, 1 Oct 61-30 Sep 62,
by M. L. Wolfrom. 25 Oct 62, 14p. refs.
(Rept. no. 1187-8)
(Contract DA 49-193-md-2143)
Unclassified report

DESCRIPTORS: *Radioprotective drugs, Carbohydrates, Acetyl radicals, Sulfur compounds, Thiols, Guanidines, Amines, Synthesis.

Carbohydrate derivatives of established radioprotective agents with guanidino or amino groups separated from a thiol group by 2 or 3 carbon atoms were synthesized in an attempt to reduce their toxicity.

AD-287 280 Div. 16
(TISTB/SAT) OTS price $1.60

Ne York State Coll. of Agriculture, Cornell U., Ithaca.
A MATHEMATICAL MODEL FOR THE DISTRIBUTION OF LENGTHS OF CHROMOSOMAL DEFICIENCIES INVOLVING A SPECIFIC LOCUS,
by K. H. Thompson, B. Wallace and W. T. Federer. 1962, 12p. incl. illus. 7 refs. (Technical rept. no. 10)
(Contract Nonr-40939, Proj. NR 042-212)
Unclassified report

DESCRIPTORS: *Chromosomes, *Mathematical analysis, Histology, Drosophila, Distribution.

A mathematical model of random two-hit breakage and deficiency is developed for the condition that the chromosomal segment lost includes an arbitrary but specific locus. Both a discrete band model and a continuous chromosome model are considered in presenting theoretical distributions for deficiency lengths, deficiency midpoints, and other related characteristics. The problem of estimating the location of essential loci is discussed for the continuous model. (Author)

AD-287 402 Div. 16
(TISTB/MD) OTS price $2.60

Applied Science Labs., Inc. College, Pa.
STUDIES ON IMPROVED I.V. FAT EMULSIONS THROUGH APPLICATION OF PHYSICO-CHEMICAL PRINCIPLES AND USE OF HIGH PURITY COMPONENTS.
Interim rept.,
by Arthur Rose, Robert F. Sweeny and others.
Oct 62, 25p. incl. illus. tables.
(Contract DA 49-193-md-2155)
Unclassified report

DESCRIPTORS: *Fats, Fatty acid esters, Cottonseed oil, Lipids, Thin films, Gases, Purification, Phospholipids, Wetting agents, Colloids, Chromatographic analysis.

Cottonseed oil, synthetic triglycerides, lecithin, Pluronic F68, Drewmulse 5998A, and Lipal 4P were studied by gas chromatography, thin layer chromatography (TLC), and column chromatography to develop methods of detecting and estimating the various major and minor components present in these materials. Gas chromatography shows presence of unexpected quantities of relatively volatile impurities in cottonseed oil. Commercially available triglycerides show major impurities by TLC and gas chromatography. It is possible to prepare triglycerides free of all of these impurities. Gas chromatography was used to show the presence of relatively volatile components in Pluronic F68. The liquid (monoester) fraction of Drewmulse 5998A contains considerable amounts of several components of varying polarity and probably different chemical nature, based on examination by TLC. TLC examination of the liquid (monoester) fraction of Lipal 4P shows at least five subsidiary components. A combination of column chromatography and thin layer chromatography procedures may be used as the basis for quantitative estimates of the cephalin, lipositol and lysolecithin content of purified lecithin of the type used in intravenous emulsions. (Author)

AD-287 416 Div. 16
(TISTB/SAT) OTS price $2.60

Army Medical Research and Nutrition Lab., Denver, Colo.
CALCIUM IN SWEAT AND ITS POSSIBLE RELATION TO CALCIUM REQUIREMENTS,
by C. Frank Consolazio, LeRoy O. Matoush and others. 16 Feb 62, 23p. incl. illus. tables, 20 refs. (Rept. no. 266)
Unclassified report

DESCRIPTORS: *Calcium, *Perspiration, Diet, Metabolic products, Metabolism, Minerals, Excretion.

These studies show that there is an appreciable quantity of calcium being eliminated in the sweat. In men exercising for 100 min a day the Ca excretion in sweat averaged 8.1 mg/hr at 70 F, 11.6 mg at 85 F, and 20.2 mg/hr at 100 F. These findings are important since they show an additional Ca loss which has not been reported in previous balance studies. It is suggested that Ca allowances for conditions likely to cause sweating be increased to compensate for losses due to sweating.

AD-287 423 Div. 16
(TISTB/LMH) OTS price $1.60

Army Medical Research and Nutrition Lab., Denver, Colo.
ENVIRONMENTAL TEMPERATURE AND ENERGY EXPENDITURE,
by C. Frank Consolazio, LeRoy O. Matoush and others. 2 Apr 62, 17p. incl. tables, 14 refs.
(Rept. no. 267)
(Proj. no. 6X60-11-001)
Unclassified report

DESCRIPTORS: *Medical research, *Metabolism, Body temperature, Humidity, Perspiration, Exercise, Food, Water, Tropical regions.

This study indicates that as the environmental temperature increases there is also an increase in metabolic rate of men performing a fixed activity. There was a significantly higher metabolic rate for men working at 100 F than at 85 and 70 F. Body temperatures also were significantly higher at 100 F than at 85 and 70 F environments. These data again suggest that there is an increase in energy requirements for men living and working in the heat. (Author)

AD-287 501 Div. 16
(TISTB/CCH) OTS price $1.10

Rutgers U., New Brunswick, N. J.
SPECTRAL SENSITIVITY OF SMALL RETINAL AREAS.
Final technical rept., 1 Aug 60-31 July 62,
by John Krauskopf. 31 Oct 62, 7p. 3 refs.
(Contract DA 49-193-md-2128)
Unclassified report

DESCRIPTORS: *Retina, Light, Sensitivity, Color, Optical Illusion, Brightness, Visual thresholds, Optical images, Visual acuity, Ophthalmology, Instrumentation, Test equipment, Monochromatic light.

Microstimulation with monochromatic lights is reviewed. The optical properties of the human eye with respect to retinal image formation were investigated with a photoelectric ophthalmoscope. Measurements were made with white light. The effects of pupil diameter were determined. The measurements allow the calculation of the nature of the retinal light distribution for any target. Experiments were performed to examine the effects of retinal image stabilization on the appearance of targets consisting of central disks of one color and annuli of another color. All possible combinations of blue, green, yellow, and red were used. When the luminance of the disk approximated that of the annulus, the disk disappeared. The outstanding finding is that when the disk disappeared the whole target was seen as a uniform disk in the color of the annulus. Experiments are reported on the effects of adding sinusoidal motion to normally fixated contrast targets. Of particular significance is the improvement in contrast thresholds when the target is oscillated at 4 cps. From this it is concluded that further research is required of the possible effects of low frequency components of normal eye movements on visual acuity. It was found that red-green brightness matches made by normal observers were systematically altered by chromatic adaptation. The same matches, which were full color matches for dichromatic observers, were found to be invariant under adaptation for dichromats. The results are interpreted as a failure of prediction from the Fick-Lever theory of deuteranopia. (Author)

AD-287 505 Div. 16
(TISTB/MD) OTS price $1.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
QUANTITATIVE DETERMINATION OF GASEOUS TISSUE NITROGEN IN ANIMALS EXPOSED TO VARIOUS SIMULATED ALTITUDES,
by S. F. Marotta, J. P. Marbarger and E. F. Robbins. Mar 62, 15p. incl. illus. tables, 17 refs. (Rept. no. 61-109)
Unclassified report

DESCRIPTORS: *Nitrogen, *Decompression sickness, Tissues (Biology), Laboratory animals, Oxygen, Liver, Muscles, Testes, Spleen, Brain, High-pressure research, Determination.

A method is described for the quantitative determination of gaseous tissue nitrogen which consists of the homogenization of tissue in water at 37 C. The observed recovery of N from water and oleic acid agrees with the calculated values, so that the present method may be regarded as sufficiently accurate for tissue analysis. The data indicate that splenic and testicular tissues contain more gaseous N than the levels observed in skeletal muscle, brain, and liver. Individual N elimination curves for each tissue indicate that the liver, testes, and muscle are essentially cleared of N within 2 hr of O2 breathing; whereas, the spleen contains approximately 65% of its original N for 4 hr. (Author)

AD-287 512 Div. 16, 4
(TISTB/MD) OTS price $3.60

Stanford Research Inst., Menlo Park, Calif.
SYNTHESIS OF POTENTIAL ANTIRADIATION DRUGS.
Annual summary rept., 1 Oct 61-30 Sep 62,
by Leon Goodman and James E. Christensen. 1 Nov 62, 28p. refs. (Rept. no. 39)
(Contract DA 49-193-md-2068)
Unclassified report

DESCRIPTORS: *Radioprotective drugs, Carbohydrates, Glycosides, Thiols, Sulfur compounds, Amines, Synthesis.

The trans-hexoside, methyl 2-amino-2,3-dideoxy-3-mercapto-D-altropyranoside hydrochloride was synthesized, employing the episulfonium ion approach and the two trans-pentosides, methyl 2-amino-2, 3-dideoxy-3-mercapto-alpha-D-arabinofuranoside hydrochloride and methyl-3-amino-2,3-dideoxy-2-mercapto-alpha-D-xylofuranoside hydrochloride, were prepared by a similar method. The cis-pentoside, methyl 3-amino-2, 3-dideoxy-2-mercapto-alpha-D-ribofuranoside hydrochloride, was synthesized by the 'complex neighboring group' method that has been employed successfully in the hexose series. The 'pendant' beta-mercaptoethylamino sugars, methyl 3-(beta-mercaptoethyl)-amino-3-deoxy-4, 6-ethylidene-alpha-D-altropyranoside hydrochloride and methyl 3-beta-mercaptoethyl)amino-3-deoxy-D-altropyranoside hydrochloride, were prepared as examples of uniquely-substituted MEA molecules. Significant progress was made toward the synthesis of methyl 6-amino-6-deoxy-L-idothiapyranose hydrochloride and its free sugar which represent the ring structures that form from 6-amino-5,6-dideoxy-6-mercapto-L-idose derivatives. (Author)

AD-287 530 Div. 16
(TISTE/LMH) OTS price $1.50

Behavioral Sciences Lab., Aerospace Medical Div., Wright-Patterson Air Force Base, Ohio.
A WORKING BIBLIOGRAPHY ON THE EFFECTS OF MOTION ON HUMAN PERFORMANCE.
Final rept., Jan 61-Dec 61 on Training, Personnel, and Psychological Stress Aspects of Bioastronautics,
by Robert Buckhout. July 62, 53p. refs.
(Proj. 1710)
(MRL TDR 62-77) Unclassified report

DESCRIPTORS: *Bibliography, *Human engineering, *Motion, Pilots, Effectiveness, Vibration, Stress (Psychology), Acceleration, Simulation, Perception, Weightlessness, Test methods, Space medicine, Stress (Physiology), Physiology.

A bibliography compiled from a number of disciplines which bear on the problem of motion and its effects on human performance is presented. Psychophysiological reports in the area of spatial orientation, perception, and receptor mechanisms provide background on the human organism in relation to motion stimuli. The effects of aerospace vehicle motion are represented by a compilation of studies of performance under acceleration, vibration and buffeting, tumbling, and weightlessness. Reports on training and motion simulation, equipment and methodology, and general analyses of the whole problem area are presented. (Author)

AD-287 566 Div. 16
(TISTB/CCH) OTS price $2.60

Mount Sinai Hospital, New York.
RELATION OF HEPATIC INJURY TO HEPATIC FIBROSIS.
Progress rept., 16 Sep 61-1 Oct 62,
by Hans Popper, Tibor Barka and others.
1 Oct 62, 15p. 44 refs.
(Contract DA 49-007-md-790)
Unclassified report

DESCRIPTORS: *Liver, Immunology, Bile, Hepatitis virus, Injuries, Tissues (Biology), Diseases.

Acute hepatic injury and processes leading to cirrhosis shifted to recognition of the factors determining chronicity, particularly fiber formation and immunologic hepatic injury was investigated. Acute hepatic injury was subdivided into alterations of the hepatocellular synthesizing and energy providing apparatus and those of the bile secretory and transport mechanism. Disturbances of the former characterize specific liver diseases with endoplasmic reticulum functionally and structurally more involved in viral hepatitis and with mitochondria more involved in alcoholic hepatitis. Cholestasis is caused by arrest of bile production and flow at different levels of the bile secretory apparatus. Specific injury of the bile ducts leading to regurgitation was demonstrated in primary biliary cirrhosis. In studying the reactions of the hepatic mesenchyma, phagocytic and protein forming cells were separated and transformation of the open circulation into closed in cirrhosis was demonstrated. Study of experimental models indicated that much of the hepatic fibrosis was related to rapid proliferation of bile ductules. Their disappearance facilitated removal of fibers which were depolymerized and became more susceptible to proteolytic enzymes and to phagocytes. (Author)

AD-287 707 Div. 16
(TISTB/LMH) OTS price $2.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE EFFECT OF COSMIC RADIATION ON PLANT ACTIVITY.
by A. A. Shakhov. 11 Oct 62, 20p. incl. illus. tables, refs. (Trans. no. FTD-TT-62-771 from Zhurnal Obshchey Biologii 23:2, pp. 81-89, 1962)
Unclassified report

DESCRIPTORS: *Biology, *Plants, *Photosynthesis, Chlorophylls, Cosmic rays, Light, Absorption, Ultraviolet radiation, Infrared radiation, Ecology, USSR, Radiation effects.

AD-287 709 Div. 16
(TISTB/LMH) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
EFFECT OF LIGHTING CONDITIONS ON THE CONVERSION OF GREEN PIGMENTS.
by O. G. Sudyna and K. P. Dovbish. 19 Sep 62, 15p. incl. illus. refs. (Trans. no. FTD-TT-62-1203 from Ukrainskiy Botanichniy Zhurnal 19:3, pp. 10-19, 1962)
Unclassified report

DESCRIPTORS: *Plants, *Photosynthesis, *Plant pigments, Chlorophylls, Light, Colors, USSR, Absorption, Chromatographic analysis, Growth.

AD-287 715 Div. 16, 12
(TISTB/SAT) OTS price $5.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
GAGARIN'S FLIGHT (Polet Gagarina (Materialy, Opublikovannyye v ''Pravde'')),
by N. Denisov and S. Borzenko. 17 Sep 62, 50p. incl. illus. (Trans. no. FTD-TT-62-844 from Izdatel'stvo ''Pravda'' 47p., 1961, Moskva)
Unclassified report

DESCRIPTORS: *Space flight, *Space capsules, *Spaceships, USSR, Space medicine, Laboratory animals, Training, Communists, Manned.

AD-287 736 Div. 16
(TISTB/SAT) OTS price $1.10

Beaudette Foundation for Biological Research, Solvang, Calif.
RESEARCH ON THE MARINE FLORA OF THE PACIFIC AREA.
Final rept., 1 Jan 60-31 Aug 62,
by E. Yale Dawson. 31 Aug 62, 3p.
(Contract Nonr-309600)
Unclassified report

DESCRIPTORS: *Marine biology, *Plants, Algae, Scientific personnel, Pacific Ocean.

AD-287 797 Div. 16
(TISTB/MD) OTS price $1.00

Midwest Research Inst., Kansas City, Mo.
TOLERANCE CRITERIA FOR CONTINUOUS INHALATION EXPOSURE TO TOXIC MATERIAL. II. EFFECTS ON ANIMALS OF 90-DAY EXPOSURE TO H2S, METHYL MERCAPTAN, INDOLE, AND A MIXTURE OF H2S, METHYL MERCAPTAN, INDOLE, AND SKATOLE.
Final rept., 15 Jan-30 Sep 61 on Health Hazards of Materials and Radiation,
by Curtis Sandage. Dec 61, 30p. incl. illus. tables, 23 refs.
(Contract AF 33(616)7055, Proj. 7165)
(ASD TR 61-519, vol. 2)
Unclassified report

Original contains color plates; all ASTIA reproductions will be in black and white. Original may be seen in ASTIA Hq.

DESCRIPTORS: *Toxicity, *Space medicine, *Indoles, *Thiols, Hematology, Gases, Blood chemistry, Blood counts, Liver, Stress (Physiology), Swimming, Pathology, Urine, Sulfides, Lungs, Tissues (Biology), Space capsules, Closed-cycle ecological systems, Primates, Laboratory animals, Methyl radicals, Metabolic products.

Physiological changes in rats, mice, and monkeys were studied during continuous 90-day exposure to controlled atmospheres of toxic vapors and

gases which might be expected to accumulate within a space capsule. Concentrations of test chemicals were those recognized as Industrial Threshold Limit Values and included: (a) hydrogen sulfide (20 ppm), (b) methyl mercaptan (50 ppm), (c) indole (10.5 ppm), and (d) a mixture of these three compounds plus skatole (3.5 ppm). Mortality rates were high only in the group exposed to a mixture of four compounds. There was evidence that animals can adapt to tolerate otherwise lethal concentrations. (Author)

AD-287 799 Div. 16
(TISTB/SAT) OTS price $17.50

McClellan Air Force Base, Calif.
PROCEEDINGS. SANITARY AND INDUSTRIAL HYGIENE ENGINEERING SYMPOSIUM, 3-6 OCTOBER 1961.
Sep 61, 1v. incl. illus. tables, refs.
Unclassified report

DESCRIPTORS: *Sanitary engineering, Space medicine, Microwaves, Dosimeters, Radiological contamination, Industrial medicine, Air, Atmosphere, Contamination, Symposia.

AD-287 810 Div. 16, 28
(TISTB/MS) OTS price $4.60

Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
STUDIES OF TEMPORARY THRESHOLD SHIFT CAUSED BY HIGH INTENSITY ACOUSTIC TRANSIENTS,
by Norman L. Carter and Karl D. Kryter.
20 Aug 62, 48p. incl. illus. tables, 4 refs.
(Rept. no. 949)
(Contract DA 49-007-md-985)
Unclassified report

DESCRIPTORS: *Psychoacoustics, *Fatigue (Physiology), *Deafness, *Auditory thresholds, *Ear, Noise, Intensity, Sensitivity.

Experiments are described which provide data on the relations between number and sound pressure level of acoustic impulses as a function of the susceptibility of different people to auditory fatigue. This information plus previously obtained data on the effects of pulse repetition rate and the results of planned experiments on the effects of rise time should provide the basis for establishing a general description of the effects of gun noise on auditory fatigue. This description should provide the means for specifying the noise characteristics of weapons and operational procedures for their use with respect to protection of the hearing of military personnel. The great variability in the susceptibility of different persons to impulses, probably due to variations in the behavior of the auditory reflex, suggests that damage risk criteria for impulse noise must be designed to protect those persons with ears far more sensitive than those possessed by the average person. Individual differences in susceptibility to auditory fatigue are much greater for impulse than for steady state noise. One of the experiments conducted revealed that persons susceptible to auditory fatigue from impulse noise were not necessarily more or less susceptible to steady state noise. (Author)

AD-287 853 Div. 16
(TISTB/MD) OTS price $1.10

Brooke Army Medical Center, Fort Sam Houston, Tex.
A COMPARISON OF INULIN AND CREATININE CLEARANCES FOR ESTIMATING GLOMERULAR FILTRATION RATE IN MAN. Research report on Basic Research in Life Sciences,
by Ralph S. Goldsmith. Oct 62, 6p. incl. tables, 7 refs. (Rept. no. MEDEW-RS-1-62)
(Proj. no. 6X99-26-001)
Unclassified report

DESCRIPTORS: *Kidneys, Inulin, Creatinine, Urine, Blood plasma, Man, Test methods, Reliability, Tests.

A highly significant correlation was demonstrated between inulin clearance and endogenous creatinine clearance in man. In addition, the confidence limits of the regression of creatinine clearance on inulin clearance do not permit the conclusion that a significant difference exists between these two estimates of glomerular filtration rate. Since creatinine clearance is the easier of the two clearances to perform, it has been adopted for all routine renal purposes. (Author)

AD-287 855 Div. 16
(TISTB/CCH) OTS price $9.60

Armed Forces Inst. of Pathology, Army Medical Center, Washington, D. C.
ANNUAL RESEARCH PROGRESS REPORT, 1 JULY 1961 - 30 JUNE 1962, PART II.
30 June 62, 1v.
Unclassified report

DESCRIPTORS: *Medical research, *Scientific reports, *Pathology, Antibodies, Bacteria, Brain, Cells (Biology), Diseases, Food, Hemoglobin, Histology, Injuries, Infants, Laboratory animals, Man, Radiation effects, Heart, Arteries, Testes, Survival, Tumors, Vibration, Lungs, Eye, Liver, Kidneys, Cancer research, Lungs, Military research.

17. METALLURGY

AD-286 932 Div. 17, 26
(TISTM/EJH) OTS price $1.25

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
MOLYBDENUM ALLOY EXTRUSION DEVELOPMENT PROGRAM. Interim technical engineering rept. no. 7, 1 June-1 Sep 62,
by P. A. Santoli. Sep 62, 13p. incl. illus. tables, 2 refs.
(Contract AF 33(600)40861, Proj. 7-785)
(ASD TR 7-785, Vol. 7) Unclassified report

DESCRIPTORS: *Molybdenum alloys, *Extrusion, Mechanical properties, Hardness, Surface properties, Manufacturing methods, Microstructure, Dies, Coatings, Zirconium compounds, Oxides, Titanium alloys, Zirconium alloys, Guided missiles.

Full length T shape extrusions of TZM were made within target requirements from 3200-3400F billet heating temperature with a reduction ratio of about 19:1. High liner pressure in excess of 200 ksi at an initial stem speed of 100 in/min was required to accomplish these extrusions. Surface quality was better than 150 RMS on full length extrustions. Few areas of glass or die coating tub-in appeared but could be removed by light conditioning. By careful application of the die coating, followed by grinding and polishing the coated surface to a finish of 100 RMS or better, striations were almost completely eliminated. Good die performance resulting in less than 0.005 in run-out on full length extrusions was achieved with zirconia coated dies. The zirconia was applied by the oxyacetylene flame-spray process with solid rod feed. (Author)

AD-287 153 Div. 17, 14, 26
(TISTM/EJH) OTS price $1.60

General Dynamics/Convair, San Diego, Calif.
MATERIAL - COATINGS AND FINISHES - HEAT TREAT PROTECTIVE - TITANIUM ALLOYS,
by D. S. Pratt, J. E. Schoffner and E. E. Keller.
24 Apr 59, 16p. incl. tables, 13 refs.
(Rept. no. 8926-006)
Unclassified report

DESCRIPTORS: *Titanium alloys, *Refractory coatings, Heat treatment, Oxidation inhibition, Butyl radicals, Titanates, Coatings, Aluminum alloys, Vanadium alloys, Mechanical properties, Tensile properties, Hardness.

Ten materials were examined as protective coatings for Ti alloys during heat treatment. Butyl titanate performed the best of the 10 materials. A 10 mil sprayed coating of butyl titanate prevented surface contamination on Ti-6Al-4V from exceeding 0.5 mil. Sheet material with 0.5 mil contamination was successfully bent over a die having a radius 4 times the metal thickness. Knoop hardness uniformly averaged 333 ± 12 over a 9.8 mil distance in from the edge of the test piece. (Author)

AD-287 200 Div. 17, 25
(TISTM/TCG) OTS price $2.75

Manufacturing Labs., Inc., Cambridge, Mass.
RESEARCH AND DEVELOPMENT ON HIGH-PRESSURE-HIGH-TEMPERATURE METALLURGY.
Final rept., 8 Feb 61-7 Mar 62 on Metallic Materials,
by S. A. Kulin, L. Kaufman and others. Aug 62, 121p. incl. illus. tables, 101 refs.
(Contract AF 33(616)6837, Proj. 7351)
(WADD TR 60-893, pt. 2)
Unclassified report

DESCRIPTORS: *Copper, *Molybdenum alloys, *Iron alloys, *Nickel alloys, *Steel, *High pressure research, *High temperature research, Reaction kinetics, Phase transitions, Heat treatment, Pressure, Transition temperature, Crystals, Tin, Thallium, Polymers, X-ray diffraction analysis, Hall effect, Lattices, Hardness, Austenite, Martensite, Crystallization, Phase studies.

The kinetics of recrystallization of polycrystalline Cu (99.999% purity) cold-rolled to 98% reduction were determined by means of an x-ray diffraction technique for the temperature range 80 to 170 C at atmospheric pressure and at 42 kilobars. High pressure is found to retard both the initiation and rate of recrystallization. The effect of high pressure on the Hall voltage of cerium has been determined. A study of the pressure-temperature characteristics of the transformation of the hexagonal phase, MoC(0.67), to the cubic phase, MoC(0.67+x) was completed. The role of C deficiency in the transformation was investigated. The results of a series of experiments designed to investigate pressure-quenching in several different Fe-Ni alloys are reported. Thermodynamic data obtained at one atmosphere is used to correlate the high-pressure transitions in thallium and tin. (Author)

AD-287 207 Div. 17
(TISTM/ODN) OTS price $9.10

Thompson, John I., and Co., Inc., Washington, D. C.
VACUUM MELTING AND PROCESSING OF METALS.
May 59, 95p. incl. illus. tables, refs.
(Contract NOrd-18264)
(NAVORD rept. no. 6993)
Unclassified report

DESCRIPTORS: *Metals, *Alloys, Vacuum systems, Bibliography, Heat-resistant alloys, Steel, Electrodes, Electron bombardment, Zone melting, Levitation, Metal coatings, Vacuum furnaces, Mechanical properties, Tensile properties, Nickel alloys, Iron alloys, Cobalt alloys, Rupture, Fatigue (Mechanics), Zirconium, Uranium, Molybdenum, Melting, Processing.

Contents: Vacuum melting and processing techniques - Induction vacuum melting, consumable electrode arc vacuum melting, nonconsumable electrode arc vacuum melting, vacuum degassing, electron bombardment melting, zone melting, levitation melting, levitation melting, vacuum metallizing; Vacuum melting equipment - High vacuum furnaces, Vacuum Pumps; Data and properties of vacuum melted metals - High temperature metals, bearing metals, reactive metals, low alloy structural steels. Bibliography.

AD-287 255 Div. 17
(TISTM/EJH) OTS price $1.60

Pitman-Dunn Labs. Group, Frankford Arsenal, Philadelphia, Pa.
LIQUID METAL EMBRITTLEMENT OF A Cu-2% Be ALLOY,
by James V. Rinnovatore. Aug 62, 14p. incl. illus. 3 refs. (Rept. no. R-1652)
(Proj. 59925001)
Unclassified report

DESCRIPTORS: *Copper alloys, *Brittle materials, *Fracture (Mechanics), *Liquid metals, Mercury alloys, Sodium alloys, Beryllium alloys, Heat treatment, Mechanical properties, Tensile properties, Processing, Aging, Hardening.

The propensity toward brittle fracture of a Cu-2% Be alloy in the presence of a 2% Na amalgam was investigated. Tensile properties of the alloy in the dry and wetted conditions were determined as a function of the following thermal-mechanical histories: solution treated and aged at 70° F; solution treated plus maximum cold rolled and aged at 70° F; solution treated, aged at 70° F for 1 hr, and cold worked; solution treated, aged at 700 F for 9 hr, and cold worked; solution treated and aged at 40° F; solution treated and cold worked. The results obtained from the conditions listed above showed that wetted fracture behavior was more affected by the manner in which the alloy was treated to obtain a particular strength than by the actual magnitude of the strength. The results are consistent with the recent findings in work with Al alloys, whereby fracture strength in a liquid metal environment was correlated with thermal-mechanical history. (Author)

AD-287 405 Div. 17, 26
(TISTM/EJH) OTS price $2.75

DuPont Metals Center, I. E., DuPont de Nemours and Co., Inc., Baltimore, Md.
A STATE-OF-THE-ART SURVEY.
Interim rept. no. 1, 15 June-15 Sep 62 on Refractory Alloy Foil Rolling Development Program.
15 Sep 62, 121p. incl. illus. tables, 32 refs.
(Contract AF 33(657)8912, Proj. 7-987)
Unclassified report

DESCRIPTORS: *Refractory materials, *Heat resistant alloys, *Niobium alloys, *Tantalum alloys, *Tungsten alloys, *Foils, Powder metallurgy, Production, Manufacturing methods, Rolling mills, Sheets, Mechanical properties, Tensile properties, Hafnium alloys, Molybdenum alloys, Vanadium alloys, Welding, Extrusion, Forging, Melting.

The state-of-the-art of the rolling of Nb, Ta, and W base alloys to foil is reviewed. Since the rolling of foil requires control of the entire processing sequence, consolidation, sheet rolling, properties of sheet, and factors such as fabricability and stage of development were analyzed. Alloys of Nb, Ta and W were recommended for rolling to foil. (Author)

AD-287 418 Div. 17, 26
(TISTA/SEB) OTS price $1.10

Aerospace Information Div., Washington, D. C.
EXPLOSIVE HOLE PIERCING,
by O. V. Popov. 11 Oct 62, 3p. incl. illus.
(AID rept. no. 62-163; Trans. from Piercing of Holes in Sheet Parts by Explosives. Kuznechno-Shtampovochnoye Proizvodstvo, No. 7, pp. 18-24, July 1962).
Unclassified report

DESCRIPTORS: *Explosive forming, Shaped charges, USSR, Translations, Sheets, Water tanks, Explosives.

A study of all known methods of explosive hole piercing showed that contact piercing by a shaped explosive charge and piercing with a high-explosive charge in a water tank are the only acceptable methods for piercing holes of various sizes and shapes in high-strength and heat-resistant materials. The contact piercing method is effective for piercing holes in flat sheet, end closures, and shells. (Author)

AD-287 429 Div. 17
(TISTM/EJH) OTS price $1.10

Colorado School of Mines, Golden.
IMPROVED OXIDATION RESISTANCE OF MOLYBDENUM BY ALLOYING WITH RARE EARTH AND OTHER SELECTED METALS.
Interim rept. no. 5, 1 July-31 Aug 62.
25 Sep 62, 5p. incl. table.
(Contract NOw 62-0305-d)
Unclassified report

DESCRIPTORS: *Molybdenum alloys, *Hafnium alloys, *Oxidation, *Coatings, Heat resistant alloys, Scale, Adhesion, Oxygen, Diffusion, Oxides, Hafnium compounds, Molybdenum compounds, Rare earth elements, Oxidation inhibitors.

Continuation of Mo-Hf alloy studies using a combination of selective oxidation and sacrificial oxidation to form a protective scale is reported. An alloy containing 50 atomic % Hf was preoxidized at 949 C to give a maximum opportunity for growth of a continuous inner scale of HfO2. Oxidation of this specimen at 725 C showed that a good adherent protective scale was formed on the two flat surfaces of the specimen, but that it cracked and spalled at the edges of the specimen. The alloy itself began to crack and spall after oxidation at 725 C. Because of the spalling of the alloy, it was not considered worthwhile to run any more preoxidation experiments with a 50 atomic % alloy. Work was done with 15 and 25 atomic % Hf alloys which were preoxidized at 1334 C and 1196 C. Subsequent oxidation showed the growth of a continuous oxide coating, but not any great resistance to O penetration. The wt. changes with the 25 and 50 atomic % Hf alloys showed that the scales contained a large percentage of MoO3. (Author)

AD-287 434 Div. 17, 26
(TISTM/EJH) OTS price $4.60

Du Pont Metals Center, E. I., Du Pont de Nemours and Co., Inc., Baltimore, Md.
COLUMBIUM ALLOY EXTRUSION PROGRAM. PHASE V: TUBING PROGRAM.
Interim technical documentary progress rept. no. 6, 15 July-15 Oct 62,
by James S. Clark. 15 Oct 62, 45p. incl. illus. tables, 5 refs.
(Contract AF 33(600)40700, Proj. 7-775)
Unclassified report

DESCRIPTORS: *Niobium, *Niobium alloys, *Extrusion, *Pipes, High temperature research, Production, Manufacturing methods, Dies, Lubricants, Glass, Heat treatment, Microstructure, Surfaces, Mechanical properties, Hardness, Tungsten alloys, Molybdenum alloys, Zirconium alloys.

Phase V of the Nb and Nb Alloy Extrusion Program was revised from the pilot production of D-31 ''T'' sections to the goal production of tubing of the alloys X-110 (Nb-10W-1Zr-.1C) and B-66 (Nb-5Mo-5V-1Zr). Two 8 in. diameter ingots of each alloy were melted and converted to 4 in. diameter billet stock by extrusion. Tube blank extrusions of 8:1 ratio were made from 3200-3400 F. The effects of various process parameters are reported. (Author)

AD-287 454 Div. 17, 26
(TISTM/TCG) OTS price $6.60

Ladish Co., Cudahy, Wis.
INVESTIGATION OF THE EFFECTS OF MELTING PROCESSES UPON THE TRANSVERSE DUCTILITY OF H11 STEEL AT HIGH STRENGTH LEVELS.
Interim engineering rept. no. 3, 23 June-23 Sep 62,
by Joseph C. Truszynski and Jack A. Yoblin.
Oct 62, 58p. incl. illus. tables, 36 refs.
(Contract AF 33(600)38767, Proj. 7-678)
(ASD TR 7-678, vol. 3) Unclassified report

DESCRIPTORS: *Steel, *Melting, Vacuum apparatus, Air, Vacuum furnaces, Electric arcs, Electrodes, Gases, Heat treatment, Mechanical properties, Tensile properties, Forging, Tests, Tables, Statistical data, Aircraft, Materials, Processing.

The Phase II analysis of transverse strength and ductility at the 280 to 300 ksi and 300 ksi minimum strength levels established that strength and ductility tend to decrease with increasing billet size, that surface specimens exhibit the most favorable properties, that consumable electrode vacuum remelted steel is unquestionably superior to either electric furnace air melted or air melted-vacuum degassed steel, and that there exists considerable variation in properties between mills for a given billet size and between billet sizes of a given mill. (Author)

AD-287 458 Div. 17, 14
(TISTM/EJH) OTS price $1.25

Surface Lab., Mass. Inst. of Tech., Cambridge.
FRICTION AND WEAR AT ELEVATED TEMPERATURES.
Final rept. on Fundamental Research on Macromolecular Materials and Lubrication Phenomena,
by Ernest Rabinowicz and Masaya Imai. July 62, 40p. incl. illus. tables, 8 refs.
(Contract AF 33(616)7648, Proj. 7342)
(WADC TR 59-603, pt. 3)
Unclassified report

DESCRIPTORS: *Lubricants, *Friction, *Metals, *Graphite, *Nitrides, Metal coatings, High temperature research, Boron compounds, Ceramic materials, Melting, Surfaces, Test equipment, Test methods, Steel, Titanium, Lead, Zinc, Tin, Cadmium, Molybdenum alloys, Oxides, Metallic compounds.

A number of substances were examined for suitability under sliding conditions in the range from room temperature to 2000 F. Low melting metals applied as surface coatings show a peak in their friction at their melting points, unless they form an oxide with good lubricating ability. Pyrolytic boron nitride and graphite have the same friction and wear properties as do ordinary forms of these materials. A discussion is presented of how information may be obtained systematically from friction-temperature runs, and examples of the various techniques are given. (Author)

AD-287 473 Div. 17, 26
(TISTM/EJH) OTS price $2.25

Pratt and Whitney Aircraft, East Hartford, Conn.
EFFECT OF SHOCK-INDUCED HIGH DYNAMIC PRESSURES ON IRON-BASE ALLOYS.
Final rept., 1 May 61-28 Feb 62 on Metallic Materials,
by Stephen M. Silverman, Loren Godfrey and others. Aug 62, 86p. incl. illus. tables, 3 refs.
(Contract AF 33(616)8190, Proj. 7351)
(ASD TDR 62-442) Unclassified report

DESCRIPTORS: *Steel, *Tool steel, *Iron alloys, *Hardening, Nickel alloys, Austenite, Martensite, Heat treatment, Tensile properties, Microstructure, Shock waves, Explosions, Processing, Mechanical properties.

The effect of high dynamic pressures generated by strong shock waves on the metallurgical properties of selected iron based alloys was investigated. This investigation included a study of the effects of shock wave duration, repeated shocks on a single test specimen, increasing shock wave intensity, and post shock heat treatment on the yield and tensile strengths of H-11 tool steel and 25% nickel steel. As a result of explosive shock hardening, H-11 steel increased in yield strength from 235 ksi in the preshocked condition to 340 ksi in the as-shocked (360 kilobars) condition, while the 25% nickel steel showed yield strength increases from 235 ksi in the austenitized-plus-aged condition to 255 ksi in the shocked-plus-aged condition. These increases in yield strength were brought about without any significant macroscopic plastic deformation. (Author)

AD-287 528 Div. 17, 30
(TISTM/EJH) OTS price $3.50

American Machine and Foundry Co., Alexandria, Va.
ULTRA-SHORT-TIME CREEP RUPTURE.
Final rept. for Oct 60-Jan 62 on Materials Applications,
by J. P. Knight, W. A. Cosby, and H. W. Leavenworth. Aug 62, 203p. incl. illus. tables
(Contract AF 33(616)7632; Continuation of Contract AF 33(616)6798, Proj. 7381)
(WADC TR 59-762, pt. 4) Unclassified report

DESCRIPTORS: *Tantalum alloys, *Creep, *Test equipment, *Refractory materials, Heat resistant alloys, High temperature research, Tungsten alloys, Sheets, Tensile properties, Mechanical properties, Rupture, Fracture (Mechanics), Re-entry vehicles, Aerodynamic heating, Nuclear explosions, Thermal stresses, Loading, Controlled atmospheres, Vacuum systems, Circuits, Design.

The design and fabrication of ultra-short-time creep test equipment and utilization of the equipment for determining the short time mechanical properties of a structural refractory metal sheet alloy at elevated temperatures was studied. Tensile test specimens of Ta-10%W alloy were strained at temperatures of 2000, 2500, 2750, and 3000 F in an argon atmosphere and in a vacuum (3000 F only). Heating of test specimens to maximum temperature was accomplished in approximately 60 msec. Tensile loading of test specimens at each temperature was accomplished prior to attaining test temperature and 1/2, 2.0, and 5.0 sec after attaining test temperature. A description of test apparatus, test procedures and complete test data are given. (Author)

AD-287 545 Div. 17
(TISTM/BRW) OTS price $1.60

North American Aviation, Inc., Columbus, Ohio.
DOD HIGH STRENGTH TITANIUM ALLOY SHEET RESEARCH PROGRAM.
Progress rept. no. 18, 31 May-31 Aug 62,
by D. E. Myers. 31 Aug 62, 21p. incl. illus. tables, 4 refs. (Rept. no. NA57H-527-18)
(Contract NOa(s) 57-785d)
Unclassified report

DESCRIPTORS: *Titanium alloys, *Sheets, Aluminum alloys, Tin alloys, Zirconium alloys, Heat treatment, Stresses, Fatigue (Mechanics), Fracture (Mechanics), Contamination, High temperature research, Alloys, Corrosion, Processing.

Data are presented for evaluations conducted on the 5Al-5Sn-5Zr and 7Al-12Zr alloys to determine the precautions necessary to prevent stress corrosion cracking problems during forming. Normal precautions during manufacturing to prevent contamination of the 5Al-2 1/2Sn titanium alloy details are adequate for the super alpha titanium alloys. A range of 1300 F for two and one half hours to 1500 F for one half hour produces 88 to 100% stress relief of both alloys. (Author)

AD-287 546 Div. 17, 12, 1
(TISTM/EJH) OTS price $5.60

National Bureau of Standards, Washington, D. C.
PROGRAMMED MANEUVER-SPECTRUM FATIGUE TESTS OF AIRCRAFT BEAM SPECIMENS.
Final rept.,
by Leonard Mordfin and Nixon Halsey. May 62, 38p. incl. illus. tables, 41 refs.
(NBS rept. no. 7472)
Unclassified report

DESCRIPTORS: *Aluminum alloys, *Airframes, *Beams, *Fatigue (Mechanics), Aircraft, Failure (Mechanics), Stresses, Loading, Test equipment, Deformation, Test methods.

The bending fatigue properties of a group of 7075-T6 Al alloy beam specimens were found to be similar to those of typical aircraft structures. Test results warrant the following conclusions regarding the constant-load-amplitude fatigue properties of the beam specimens. Static prestressing at 100 pct lim load improved the fatigue life of the specimens at fatigue load levels of 60 pct lim load or less, provided that the preload was applied in the same direction as the subsequent fatigue loads. Periodic single overstressing at 100 pct lim load affected the fatigue properties in the same way as prestressing did, only more so. Periodic repeated understressing at 25 pct lim load produced no significant changes in the fatigue life under fatigue loads applied in the same direction as the understressing. There were indications that positive load levels below a certain cutoff point in the spectrum did not introduce significant fatigue damage. The spectrum cutoff concept applies only to positive load levels. (Author)

AD-287 548 Div. 17
(TISTM/BRW) OTS price $3.00

Nuclear Metals, Inc., Cambridge, Mass.
REFRACTORY METAL CONSTITUTION DIAGRAMS.
Final rept., Apr 60-Dec 61 on Metallic Materials,
by E. J. Rapperport, M. F. Smith and others.
Sep 62, 185p. incl. illus. tables, 43 refs.
(Contract AF 33(616)7157, Proj. 7351; In cooperation with Massachusetts Inst. of Tech., Cambridge, Mass. and Westinghouse Research Labs., Pittsburgh, Pa.)
(WADD TR 60-132, pt. 2) Unclassified report

DESCRIPTORS: *Tungsten alloys, *Molybdenum alloys, *Tantalum alloys, *Alloys, Metals, Rhodium alloys, Iridium alloys, Zirconium alloys, Osmium, Rhenium alloys, Hafnium alloys, Phase studies.

Data on six binary constitution diagrams and two ternary constitution diagrams of some of the refractory metals are presented. The binary diagrams include Mo-Os, Ta-Ir, Ta-Rh, Ta-Zr, W-Ir, and W-Rh; the ternaries are Mo-Hf-Re and Ta-W-Zr. Care was taken to obtain reliable diagrams. In particular the purity of the constituents (99.9% +) was protected at all times, and the temperatures were measured to an accuracy of ±20 C. (Author)

AD-287 594 Div. 17
(TISTM/ODN) OTS price $1.10

Armour Research Foundation, Chicago, Ill.
FIBER-REINFORCED METALS AND ALLOYS.
Bimonthly rept. no. 3, 4 Aug-4 Oct 62,
by N. M. Parikh. 26 Oct 62, 6p. incl. illus.
(Rept. no. ARF B241-3)
(Contract NOw 62-0650-c)
Unclassified report

DESCRIPTORS: *Metals, *Reinforcing materials,, *Composite materials, Alloys, Metallic textiles, Beryllium, Silver alloys, Aluminum alloys, Germanium alloys, Wire, Powder metals, Melting, Fibers, Germanium, Chemical milling, Nitric acid, Fluorides, Hydrogen compounds, Microstructure.

Be fiber-Ag alloy matrix composites were prepared from 0.0047 in diam wires. Although there is an etching effect on the wire surfaces due to the high processing temperatures, the bond between Be fiber surface and Ag matrix is a coherent one. Powders were prepared by melting and atomization. The Al alloy matrix was used for preparing some extruded bars for determining the optimum heat treatment conditions. All these composites are being evaluated. (Author)

AD-287 620 Div. 17
(TISTM/ODN) OTS price $1.60

General Dynamics/Convair, San Diego, Calif.
EFFECTS OF ALUMINUM ALLOY 4043 METAL SPRAYED OVERLAYS ON CLAD 2024-T3 ALUMINUM ALLOY SHEET ON MECHANICAL PROPERTIES, CORROSION RESISTANCE, AND FATIGUE LIFE ON MATERIALS - COATINGS AND FINISHES - METAL SPRAY COATINGS FOR ALUMINUM,
by A. Giuntoli, P. W. Bergstedt, and H. C. Turner.
25 Nov 59, 9p. incl. illus. tables (Rept. no. 8926-038)
Unclassified report

DESCRIPTORS: *Aluminum alloys, *Alloys, Mechanical properties, Corrosion-resistant alloys, Fatigue (Mechanics), Sheets, Tests, Aluminum coatings, Aluminum, Sprays, Metal coatings.

Scratched and unscratched 0.100 in thick clad 2024-T3 Al alloy specimens for mechanical properties, corrosion and fatigue tests were metal spray overcoated with 4043 Al alloy to observe the effect of metal spray coatings on material properties, and the merit of the overspray for scratch damage repair. Tests showed that metal sprayed overlays did not affect the mechanical properties or corrosion resistance of Clad 2024-T3 Al alloy sheet which contained scratches which were confined to the cladding layers. Scratches in the clad layers displayed an adverse effect on fatigue life. Metal spray repaired scratches in cladding layers of Clad 2024-T3 Al alloy did not adversely affect the fatigue life of the sheet material. (Author)

AD-287 637 Div. 17
(TISTM/TCG) OTS price $1.60

Aerojet-General Corp., Azusa, Calif.
INVESTIGATION OF STRESS-CORROSION CRACKING OF HIGH STRENGTH ALLOYS.
Quarterly progress rept. no. 7, 1 July-30 Sep 62,
by R. B. Setterlund. 2 Nov 62, 5p. illus. tables (Rept. no. 0414-01-7)
(Contract DA 04-495-ORD-3069)
Unclassified report

DESCRIPTORS: *Heat resistant alloys, *Titanium alloys, *Steel, *Stainless steel, *Stresses, *Corrosion, Aluminum alloys, Vanadium alloys, Fracture (Mechanics), Failure (Mechanics), Corrosive liquids, Sea water, Alloys, Tensile properties, Corrosive gases, Rocket cases.

An investigation of the stress corrosion cracking characteristics of at least 3 new high strength alloys of interest for rocket motor case applications was made. These alloys will be 6Al-4V titanium, 18-Nickel Maraging steel, and 20-Nickel Maraging steel, in addition to limited testing of vacuum-melted 9Ni-4Co steel. Other objectives were: to study the environmental parameters that could affect the rate and extent of stress-corrosion cracking, to determine the effect of material parameters - composition, strength level, welding and microstructure on stress-corrosion susceptibility, and to continue the evaluation of protective coatings and other techniques for preventing stress-corrosion cracking. In addition to the bent-beam and U-bend test methods, an accelerated test method employing notched tensile specimens will be introduced. (Author)

AD-287 671 Div. 17
(TISTM/EJH) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
RESULTS OF STRESS-RUPTURE TESTING OF CAST NICKEL ALLOYS AT 800 DEGREES,
by R. P. Zaletayeva. 24 Sep 62, 6p. incl. illus. tables (Trans. no. FTD-TT-62-720 from Tsentral'nyy Nauchno-issledovatel'skiy Institut Tekhnologii i Mashinostroyeniya 101: pp. 205-209, 1961)
Unclassified report

DESCRIPTORS: *Nickel alloys, *Heat resistant alloys, *Casting, Stresses, Rupture, Castings, Gas turbines, USSR, Mechanical properties.

At the present level of alloying, the alloy A has a high resistance and is extensively used in industry for short-term service, of the order of 100-300 hr. The high heat resistance of the alloy at a comparatively economic alloying is of interest from the point of view of its utilization for longer service periods than that which occurs in aviation. Alloy B is a modification of alloy A. The present article cites the results of testing specimens of these alloys made

by the precision casting method, and also specimens from alloy B cast in sand molds. As a result of the stress-rupture tests it was concluded that alloy B has higher values of stress-rupture strength than alloy A at 800 degrees. A change in the casting method of alloy A (precision casting and sand-mold casting) does not have any substantial effect on the stress-rupture strength. (Author)

AD-287 702 Div. 17
(TISTM/BRW) OTS price $11.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
METALLURGY, METALLOGRAPHY, AND PHYSICAL-CHEMICAL INVESTIGATION METHODS (SELECTED ARTICLES),
7 Sep 62, 143p. incl. illus. tables, 7 refs. (Trans. no. FTD-TT-62-134 from Metallurgiya, Metallovedeniye Fiziko-Khimicheskiye Metody Issledovaniya, Trudy Instituta Metallurgii Imeni A. A. Bankova, Moskva, No. 8, pp. 54-106, 120-127, 149-165, 269-277, 1961)
Unclassified report

DESCRIPTORS: *Alloys, *Metals, Titanium alloys, Vanadium alloys, Iron alloys, Copper alloys, Aluminum alloys, Carbon alloys, Steel, Corrosion, Stresses, Niobium alloys, Crystal structure, Hardness, USSR, Microstructure, X-ray diffraction analysis, Metallurgy, Polarization, Physical chemistry, Vanadium, Phase studies, Metallurgical analysis.

Contents:
A Phase Equilibrium Diagram for the Titanium-Vanadium-Iron System
Vanadium and the Areas of its Application
The Metallochemistry of Vanadium
Research on Vanadium-Copper-Carbon and Vanadium-Copper-Aluminum Alloys
The Influence of Tensile Stresses on the Corrosion Rate of Metals
The Influence of Polarization and PB-5 Inhibitor on the Corrosive Decrepitation of Carbon Steels
The Structure and Properties of Alloys at the Niobium Corner of the Niobium-Vanadium-Aluminum System

AD-287 719 Div. 17
(TISTM/ODN) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
NIOBIUM AND ITS ALLOYS,
by G. B. Zakharova, D. B. Mishana, and E. Ya. Velmozhnyy. 17 Sep 62, 10p. incl. illus. tables, 10 refs. (Trans. no. FTD-TT-62-1256 from Tsvetnye Metally, No. 4, pp. 88-92, 1962)
Unclassified report

DESCRIPTORS: *Niobium alloys, *Alloys, *Niobium, Stability, Tungsten alloys, Titanium alloys, Molybdenum alloys, Heat treatment, Stresses, USSR, Mechanical properties.

Data were obtained during testing in vacuum carried out on rod shaped materials subjected to cold or hot deformation with subsequent annealing to remove internal stresses. Of interest are the data on comparing the strength characteristics of rod shaped and sheet material made of Nb alloy. Investigations carried out on the F-48 alloy established that, by ultimate strength and lasting strength at temperatures of 1100-1200 F, the sheet is only by 5-10% poorer than the rods made of the same alloy. The most heat resistant Nb base alloys are F-48 and F-50 alloys. Alloying with W shows a favorable effect on the improvement of heat resistance. It simultaneously sharply increases the specific weight and reduces the technological factor of the alloys because of the formation of a liquation zone. (Author)

AD-287 819 Div. 17
(TISTM/TCG) OTS price $6.60

General Dynamics/Fort Worth, Tex.
METHODS OF PREDICTING AND/OR IMPROVING MATERIALS FATIGUE LIFE,
by R. L. Jones. 24 Oct 62, 63p. incl. illus. tables, 13 refs. (Rept. no. FGT-2096)
(Contract AF 33(657)7248)
Unclassified report

DESCRIPTORS: *Steel, *Fatigue (Mechanics), *Aluminum alloys, Test methods, Nitrides, Radioactive isotopes, Ultrasonics, Non-destructive testing, Machining, Chemical milling, Electrolytic polishing, Surfaces, Vacuum systems, Melting, Hardness, Failure (Mechanics), Alloys, Airframes, Mechanical properties.

Test results of 2 yr of research effort directed toward the study of fatigue problems pertaining to aircraft materials and processes are presented. The test program consisted of separate investigations on fatigue crack detection processes, effect of surface removal on restoring the fatigue life of alloy steels, comparison of the fatigue properties of vacuum melted SAE 4340 to conventional melted SAE 4340 steel, and determination of the static and dynamic properties of nitrided nitralloy 135 modified steel. The significant accomplishments of each phase are given. An attempt was made to utilize radioactive isotopes as a sensitive method for fatigue crack detection similar to the dye penetrant procedure. Somewhat better success was obtained in an evaluation of ultrasonic detection of fatigue cracks. The effect of removal of the fatigue damaged surface layer of specimens was investigated to determine if the fatigue life could be restored by this process. The 4 methods of surface removal evaluated were machining, dynamic etching, electropolishing, and shot peening. Shot peening resulted in surface repair by forming compressive residual stresses rather than surface removal. (Author)

AD-287 825 Div. 17, 26
(TISTM/BRW) OTS price $1.60

General Dynamics/Fort Worth, Tex.
FMS-0105 AND FMS-0132 TITANIUM ALLOY SHEET - INVESTIGATION OF AGING CYCLE AND ADDENDUM NO. 1,
by R. J. McClintick. Mar 60, 16p. incl. illus. tables (Rept. no. PCTR 4553)
(Contract AF 33(657)7248)
Unclassified report

DESCRIPTORS: *Titanium alloys, *Sheets, Aluminum alloys, Molybdenum alloys, Vanadium alloys, Iron alloys, Chromium alloys, Heat treatment, Mechanical properties, Quality control, Tensile properties, Aging, Processing.

Standard tensile specimens of Ti alloys FMS-0105A and FM-0132 in the solution treated condition were aged for various lengths of time from 1 to 6 hr at the standard aging temperature. Tensile properties were then determined for 20 different sheets of both alloys representing several gauges and heats using a shortened aging cycle selected from the results of the initial tests. Finally, the effect of thermal exposure at 800 F for 100 hr was determined on specimens aged with the shortened cycle. FMS-0105-ST Ti sheet can be aged for 1 instead of 6 hr at 900 F and still conform to both the mechanical property and thermal stability requirements of FMS-0105 with a reasonably low rejection rate. FMS-0132-ST Ti sheet suffers a significant loss in strength when the standard aging cycle of 6 hr at 925 F is reduced. (Author)

AD-287 852 Div. 17
(TISTM/BRW) OTS price $2.50

Kaiser Aluminum and Chemical Corp., Spokane, Wash.
RESEARCH STUDY FOR DEVELOPMENT OF ALUMINUM BASE ALLOYS BY POWDER METALLURGY TECHNIQUES.
Summary proj. rept., 1 Mar 59-30 June 61,
by S. G. Roberts. 15 Nov 61, 103p. incl. illus. tables, 2 refs. (Rept. no. MS PR 61-69)
(Contract DA 04-200-507-ORD-886, Proj. 04922)
Unclassified report

DESCRIPTORS: *Aluminum alloys, *Powder metallurgy, Magnesium alloys, Manganese alloys, Copper alloys, Zinc alloys, Zirconium alloys, Titanium alloys, Vanadium alloys, Chromium alloys, Iron alloys, Cobalt alloys, Additives, Extrusion, Microstructure, Hardening, Deformation, Mechanical properties, Heat treatment, Corrosion, Powder alloys.

The properties of wrought Al base alloys fabricated by extrusion of prealloyed powders were compared with those of extrusions from small billets of conventional wrought plate. Both work hardening alloys (3003 and 5083) and age hardening alloys (2024 and 7075) were included. In all alloys, the extrusions of prealloyed powders contained a more uniform dispersion of much smaller intermediate phase constituents than those made from conventional material. In alloys 3003 and 5083, by comparison to conventional material, prealloyed powders gave: (1) higher tensile properties in as-extruded and as-cold-worked extrusions, (2) increased resistance to recrystallization, and (3) higher work strengthening rates during cold working. In alloys 2024 and 7075, tensile properties of unrecrystallized heat treated alloy powder extrusions were equivalent (2024) or inferior (7075) to those of unrecrystallized extrusions of plate. The powder extrusions were found to be more resistant to re-, crystallization than conventional material. An exploratory survey of alloy compositions was conducted in the Al-Mn, Al-Mg and Al-Zn-Mg-Cu systems. (Author)

AD-287 873 Div. 17, 27
(TISTM/BRW) OTS price $2.00

Armour Research Foundation, Chicago, Ill.
EVALUATION OF COATING SYSTEMS FOR HIGH STRENGTH, LOW ALLOY STEEL EXTERIOR MISSILE AND ROCKET CASINGS.
Final rept., 3 Jan 61-28 Feb 62 on Materials Applications,
by H. R. Nelson and K. E. Hofer. May 62, 66p. incl. illus. tables.
(Contract AF 33(616)7739, Proj. 7381)
(ASD TDR 62-421)
Unclassified report

DESCRIPTORS: *Steel, *Rocket cases, Organic coatings, Adhesion, Preparation, Fatigue (Mechanics), Tensile properties, Thermal expansion, Stresses, Corrosion, Abrasion, Sheets, Plastic coatings, Rubber coatings, Enamel coatings, Weatherproofing, Tests, Coatings, Corrosion inhibition.

Existing coating systems were evaluated by exposing coated metal specimens to environments to which missile and rocket casings may be exposed during fabrication, storage, shipment and readiness. SAE 4340 steel was the substrate material. The protection afforded the substrate was evaluated by direct tests of the coatings or by the change in the performance of the coating or substrate following exposure to various adverse environments. Sixteen coating systems were studied. Tension, fatigue, embrittlement, abrasion, adhesion, flexibility, stress-corrosion, thermal change and humidity, accelerated weathering, and salt spray corrosion were the tests made. (Author)

AD-287 874 Div. 17, 25
(TISTM/BRW) OTS price $1.10

Syracuse U., N. Y.
CRACK INITIATION IN METALLIC MATERIALS.
Quarterly progress rept. no. 4, 1 Mar-1 June 62,
by Volker Weiss, John G. Sessler and Klaus Schroder. June 62, 6p. incl. illus. 3 refs.
(Contract NOw-61-0710-d)
Unclassified report

DESCRIPTORS: *Metals, *Tungsten, *Sheets, Stresses, Deformation, Grains (Metallurgy), Surface properties, Failure (Mechanics), Theory, Fracture (Mechanics).

Experimental results on the standard size sheet specimens having machined surfaces are illustrated. From the limited data available it appears that the data are in agreement with a maximum stress failure concept and that the equivalent particle size n is approximately 0.006 in. This is considerably higher than the particle size previously reported for a brittle titanium alloy. (Author)

AD-287 893 Div. 17, 26
(TISTM/BRW) OTS price $9.60

General Dynamics/Fort Worth, Tex.
PROCESS CONTROL - HEAT TREATMENT OF 17-7 PH; EFFECT OF VARYING TIME AND TEMPERATURE ON TH-1050 CONDITION,
by Wm. A. Token. Sep 58, 109p. incl. illus. tables (Rept. no. PCTR-4379)
(Contract AF 33(657)7248)
Unclassified report

DESCRIPTORS: *Stainless steel, Heat treatment, Brazing, Cooling, Dispersion hardening, Time, Temperature, Mechanical properties, Transformation, Sheets, Thickness, Microstructure, Processing.

Graphs of varying time and temperatures of brazing, transformation, refrigeration and precipitation hardening cycles are presented which show how the mechanical properties of 17-7 PH are affected. The graphs are computed from an average of the 5 specimens used for each individual test. Photomicrographs of random selected heat treatments are shown. An attempt was made to identify by photomicrographs the heat treatment used, but that is physically impossible. Subsequent heating of the transformed steel in the range of 200 to 1200 F develops additional increases in strength with the maximum effect in the vicinity of 950 F. This behavior is believed caused principally by the precipitation of an intermetallic compound. X-ray diffraction measurements indicate the presence of such a compound in the hardened steel, but it has not been seen in the optical microscope. The compound is unidentified, but is presumed to be nickel-aluminum. (Author)

AD-287 894 Div. 17, 26
(TISTM/BRW) OTS price $9.10

General Dynamics/Fort Worth, Tex.
MATERIALS - SAE 4335 (MODIFIED) STEEL - 260,000 TO 280,000 PSI HEAT TREATMENT - DEVELOPMENT OF PROCESS CONTROL AND MECHANICAL PROPERTIES FOR.
Interim rept. no. 1,
by R. L. Jones. 29 Jan 58, 102p. incl. illus. tables (Rept. no. FGT-1659)
(Contracts AF 33(038)21250 and AF 33(657)7248)
Unclassified report

DESCRIPTORS: *Steel, Heat treatment, Mechanical properties, Airframes, Fatigue (Mechanics) Tests, Manufacturing methods, Arc welding, Stresses, Cadmium plating, Chromium plating, Processing.

The best heat treatment for optimum combination of all mechanical properties of SAE 4335 at the 260,000 to 280,000 psi strength level is (1) austenitize at 1525 F for one hr, (2) quench in agitated oil to room temperature, (3) temper at 465 F for two hr, and (4) air cool to room temperature. The mechanical properties of SAE 4335 heat treated to the tensile strength level of 260 to 280 ksi by this procedure indicate that (1) SAE 4335 has superior ductility and impact properties to SAE 4340, (2) the baking cycle of 3 hr at 375 F was not sufficient to remove the embrittling effect of cadmium plating upon SAE 4335, (3) shot peening improved the sustained load strength of cadmium plated specimens, (4) welding efficiency of approximately 77% can be achieved in arc welded SAE 4335, (5) SAE 4335 is not weldable by Menasco's Uniweld process using techniques established for 4340, (6) SAE 4335 has superior fatigue properties to 4340 at stress levels below 140,000 psi, (7) chromium and cadmium plating lowered the fatigue strength of 4335, and (8) shot peening improved the fatigue strength of 4335.

18. MILITARY SCIENCES AND OPERATIONS

AD-287 060 Div. 18
(TISTB/CCH) OTS price $4.60

RAND Corp., Santa Monica, Calif.
THE RESOLUTION OF THE SOVIET CONTROVERSY OVER CIVIL DEFENSE,
by Leon Goure. June 62, 42p. refs. (Memo. no. RM-3223-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Civilian defense systems, Propaganda, USSR.

Some recent developments in the Soviet civil defense program are described. Differences between foreign and domestic Soviet propaganda on civil defense are listed, and a debate among the Soviet leaders on the value of civil defense is described -- a debate that was resolved at the May 1962 Congress of DOSAAF (the civil volunteer organization).

AD-287 725 Div. 18
(TISTW/RD) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
AN ANTIMISSILE BEAM,
by V. Krasnov. 10 Aug 62, 5p. incl. illus. (Trans. no. FTD-TT-62-1130 from Krasnaya Zvezda, p. 3, cols. 5-7, 17 July 1962)
Unclassified report

DESCRIPTORS: *Guided missile countermeasures, *Lasers, USSR, Guided missiles (Surface to air)

AD-287 727 Div. 18
(TISTB/LMH) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
WEST BERLIN IS A BRIDGEHEAD OF SABOTAGE AGAINST PEACE.
31 Aug 62, 8p. incl. illus. (Trans. no. FTD-TT-62-1168 from Pravda, No. 215(16071), p. 6, 3 Aug 62)
Unclassified report

DESCRIPTORS: *Germany, *USSR, Military intelligence, Military facilities, Military organizations, Foreign policy, Propaganda.

AD-287 839 Div. 18, 32
(TISTB/JAB) OTS price $28.50

Foreign Technology Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
MILITARY STRATEGY (Voyennaya Strategiya),
ed. by V. D. Sokolovskiy. 20 Nov 62, 612p. incl. tables, 124 refs. (Trans. no. FTD-TT-62-1289 from Voyennoye Izdatel'stvo Ministerstva Oborony SSR Moskva, pp. 458, 1962)
Unclassified report

DESCRIPTORS: *Military operations, *Political science, *Economic conditions, *USSR, *War potential, Industrial mobilization, Warfare, Communism, Armed Forces, Space weapons, Military budgets, Civil Defense systems, History, National Defense, Military transportation, Air Force operations, Naval operations, Military training, Weapons, Military mobilization, Great Britian, Germany, Foreign policy, Agriculture, Social science, Nuclear warfare, Logistics.

Contents:
Chapter I. General concepts
General information regarding military strategy
Strategy and politics
Strategy and economics
Strategy and moral-political factors
Strategy and military doctrine
The class essence of bourgeois military strategy
The class essence of Soviet military strategy
Chapter II. Military strategy of Imperialist Countries and their preparation of new wars
Chapter III. The development of Soviet military strategy (1917-1945)
Chapter IV. The nature of modern war
Chapter V. Problems of the building of Armed Forces
Chapter VI. Methods of conducting warfare
Chapter VII. Preparing a country for the repulsion of aggression
Chapter VIII Leadership of the Armed Forces

19. NAVIGATION

AD-287 217 Div. 19, 12
(TISTW/PCR) OTS price $3.60

Aerospace Information Div., Washington, D. C.
RADIO GUIDANCE ANNOTATED BIBLIOGRAPHY (PRELIMINARY).
18 Oct 62, 30p. (AID rept. no. 62-[illegible])
Unclassified report

DESCRIPTORS: *Radio navigation, *Guidance, *Bibliography, USSR, Range finding, Control, Antiaircraft defense systems, Rockets, Gyroscopes, Inertial navigation, Automatic pilots, Lasers, Cybernetics, S band, X band, Satellite vehicles, Radar tracking, Telemetering, Infrared detection, Radio, Guided missiles.

This bibliography is based on Soviet open-source materials available at the Aerospace Information Division and the Library of Congress. The materials were published from 1958 through the first half of 1962. Titles of Soviet

monographs are given in transliterated form, followed by the English translation. Library of Congress call numbers are included at the end of an entry when the item is cataloged and available in the collections of the Library. Annotations are omitted in several cases when the title is self-explanatory. The 152 entries are arranged alphabetically by author. Information not directly related to the assigned subject is included because of its broad implications for study in this field. (Author)

AD-287 672 Div. 19
(TISTW/RD) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
A GYROSCOPE WITH A FLUID ROTOR,
by V. V. Kastrov and V. M. Rogovoy. 10 Oct 62, 3p. incl. illus. (Trans. no. FTD-TT-62-761 from Soviet Patent no. 134453 (649943/26) 5 Jan 60)
Unclassified report

DESCRIPTORS: *Gyroscopes, *USSR, Fluids, Rotation, Phosphorescence.

A gyroscope with a fluid rotor is described. It is made in the form of a spherical chamber which is filled with a fluid and can be rotated by a motor and differs in that, in order to accomplish momentless readings, a phosphorescent fluid is used in it which is illuminated through the windows of the chamber, and a microscope with a photoelectric system is used to make the readings. (Author)

20. NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

AD-287 028 Div. 20
(TISTB/CCH) OTS price $3.60

Defense Atomic Support Agency, Washington, D. C.
LIST OF MILITARY AND CIVIL DEFENSE RADIAC DEVICES 1962,
by Robert H. Booth. 1962, 28p. (Rept. no. DASA 1243 rev.)
Unclassified report

DESCRIPTORS: *Directories, *Radiation instruments, Radiation alarms, Radiation counters, Detectors, Monitors, Training devices, National defense, Classification.

Contents:
Rate meters
  Low range survey meters
  High range survey meters
  Alpha detectors
  Neutron detectors
  Special purpose rate meters
  Training devices
Dosimeters
  Self indicating dosimeters
  Non self indicating dosimeters
  Alarm type dosimeters
  Chargers and readers
Miscellaneous radiac equipment
  Calibration sources
  Special purpose equipment
Research and development items
  Survey meters
  Dosimetry
  Special purpose meters
  Miscellaneous
Index
  Cross reference
  Definition of usage classification

AD-287 071 Div. 20, 16
(TISTB/CCH) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
LIGHTWEIGHT RECOVERABLE COSMIC-RAY DETECTORS. A FILM BADGE DOSIMETER,
by Loren C. Logie, Joseph S. Pizzuto and others. Feb 62, 8p. incl. tables, 7 refs. (Rept. no. 62-28)
Unclassified report

DESCRIPTORS: *Film badges, *Dosimeters, Cosmic rays, Radioactive isotopes, Protons, X rays, Recovery, Detectors.

A film badge dosimeter (RBLD) was devised to provide a rapid method for determining effective energies below 200 kev of an unknown electromagnetic radiation. The dose response of the RBLD was calibrated to x-radiation at several different effective energies as low as 24 kev to 198 kev. The film used in this dosimeter (the 510 emulsion) is the insensitive one of the 552 Dupont film packet. Data in this report correlate film densities with dose for 4 high-energy radiations. These radiations were Co(60) gamma, 14 Mev protons, 730 Mev protons, and 900 Mev alphas. A method to reduce film density variances arising from small differences in film processing is also described. A pre-exposed radiation-control film is developed simultaneously with each set of experimental films. The net densities of the experimental films are then raised or lowered in the same proportion needed to give a net density of 1.6 for the radiation-control film. (Author)

AD-287 129 Div. 20
(TISTP/WH) OTS price $1.10

Maryland U., College Park.
GIANT RESONANCE DIPOLE TRANSITIONS IN NUCLEI,
by Richard A. Ferrell. Aug 62, 8p. (Technical rept. no. 268)
(Sponsored in part by the Office of Naval Research)
Unclassified report

Presented at the October, 1961 Gatlinburg Conference on Electromagnetic Transistions and Lifetimes in Nuclei.

DESCRIPTORS: *Gamma rays, *Nuclei, *Nuclear resonance, *Elastic scattering, *Differential cross sections.

AD-287 130 Div. 20
(TISTP/WH) OTS price $1.60

Michigan U., Ann Arbor.
PION-NUCLEON DIFFRACTION SCATTERING AT 3, 4, 5 GeV/c,
by C. C. Ting, L. W. Jones and M. L. Perl. Oct 62, 11p. incl. illus. table (Technical rept. no. 7)
(Contract Nonr-122423)
Unclassified report

DESCRIPTORS: *Elastic scattering, *Differential cross sections, *Pions, *Proton scattering.

The elastic differential cross section of negative pions on protons at 3.15, 4.13 and 4.95 GeV/c and of positive pions on protons at 2.92 GeV/c was measured in a spark chamber experiment using the Bevatron of the Lawrence Radiation Laboratory. The data in the diffraction region for these momenta is reported. The interest in this diffraction data centers about the recent theoretical developments in the field of strong interactions, which predict that at sufficiently

high energies the differential cross section in the diffraction region should be an exponential function of the four-momentum transfer, and that the width of the diffraction peak should decrease with increasing energy. Our data show the predicted exponential behavior for small four-momentum transfer, but no statistically significant shrinkage of the pi(-) + p diffraction peaks over the 3 to 5 GeV/c interval is observed. (Author)

AD-287 133 Div. 20
(TISTP/WH) OTS price $1.60

Illinois U., Urbana.
THREE-BODY LEPTONIC DECAY MODES OF K-MESONS,
by J. D. Jackson and R. L. Schult. Oct 62, 15p. incl. table, 22 refs. (Technical rept. no. 43)
(Contract Nonr-183405)
Unclassified report

DESCRIPTORS: *Mesons, *Radioactive decay, *Nuclear spins.

The three-body leptonic decay modes of K-mesons was investigated extensively during the past year. The data indicate some interesting results which have not been sufficiently emphasized in the literature. In this analysis the present situation is reviewed, pointing out those models which seem excluded by the data and those which could be tested with additional experimental investigation. Three properties of the decay mechanism which were investigated are the spin and isospin symmetries of the matrix element and the dynamics of the interaction as shown by the form factors. (Author)

AD-287 431 Div. 20, 4
(TISTM/TCG) OTS price $2.60

Quartermaster Research and Engineering Command, Natick, Mass.
IRRADIATION ''FACTOR-DEPENDENCY'' SOME VINYL MONOMERS: DOSE RATE AND OTHER VARIABLES,
by Edward F. Degering, Gerald J. Caldarella, and Flora E. Evans. June 61, 24p. incl. illus. (Radiation Chemistry Laboratory series rept. no. 8)
Unclassified report

DESCRIPTORS: *Polymers, *Vinyl radicals, *Radiation effects, *Polymerization, Chemical reactions, Dose rate, Electron accelerators, Electron bombardment, Acetate, Acrylonitriles, Processing.

The effect of dose rate in the irradiation-induced polymerization of vinyl monomer systems is indicated as follows: (1) is a function of the monomer system, (2) is interdependent on the experimental conditions and operational parameters, and (3) does not follow the kI(1/2) formulation for the monomer systems studied under the experimental conditions and operational parameters employed. (Author)

AD-287 433 Div. 20
(TISTM/ODN) OTS price $1.75

Defense Metals Information Center, Columbus, Ohio.
ELECTRON-BEAM PROCESSES,
by H. W. Mishler and R. E. Monroe. 15 Sep 62, 54p. incl. illus. tables, 89 refs. (DMIC rept. no. 174)
(Contracts AF 18(600)1375 and AF 33(616)7747)
Unclassified report

DESCRIPTORS: *Electron beams, *Welding, *Metals, Machining, Bibliography, Electrons, Stainless steel, Electron accelerators, Electron guns, Electronic equipment, Industrial equipment, Machines, Melting.

Operation of the electron-beam process for welding, melting, and machining is described. The different classes of equipment for each of the 3 processes are discussed, and commercially available equipment, both domestic and foreign, is described and illustrated. (U)

AD-287 490 Div. 20, 4
(TISTM/TCG) OTS price $1.60

Cornell U., Ithaca, N. Y.
THE PHOTOELECTRIC K-ABSORPTION CROSS SECTION OF BERYLLIUM,
by T. J. Peterson, Jr. July 62, 14p. incl. illus. 14 refs. (Technical rept. no. 8)
(Contract Nonr-40137, Proj. NR 017-625)
Unclassified report

DESCRIPTORS: *Beryllium, *Photoelectric effect, *Absorption, *Neutron cross sections, Photons, Energy, Nuclear energy levels, Vacuum systems, Spectrophotometers, K band, Ionization, Theory.

Measurements of the absolute photoelectric absorption cross section for Be at photon energies slightly greater than the K-ionization threshold energy are presented. Photoelectric absorption by 2's in electrons is possible, but even if the data for wavelengths greater than 115A is extrapolated, the contribution to the total cross section appears to be negligible. This is in accord with the general expectation that K-absorption, if energetically possible, will be strongly favored over L-absorption. (Author)

AD-287 561 Div. 20, 14, 4
(TISTM/ODN) OTS price $2.60

Quartermaster Research and Engineering Command, Natick, Mass.
IRRADIATION ''FACTOR-DEPENDENCY'': SOME VINYL MONOMERS; ''OUT-SCATTERING,'' ''IN-SCATTERING,'' AND NON-UNIFORMITY OF THE SCANNING BEAM,
ed. by F. Degering, Gerald J. Calderella and Flora E. Evans. Nov 61, 19p. incl. table, refs. (Radiation Chemistry Laboratory series research rept. no. 9)
Unclassified report

DESCRIPTORS: *Polymerization, *Electron accelerators, Vinyl radicals, Scattering, Processing, Preparation, Electrons, Styrenes, Polymers, Silicones, Oils, Methyl radicals, Acids, Butyl radicals, Acrylic resins, Acetates, Water, Acrylonitriles.

This report presents substantial evidence for a balancing effect between out-scattering of radiation energy and in-scattering, when one-inch pyrex tubes are used as the container for the irradiation-induced polymerization of vinyl monomers with an electron accelerator, and data which indicate a non-uniformity of the order of about 9% of the beam scan. (Author)

AD-287 623 Div. 20
(TISTB/SAT) OTS price $2.60

Naval Radiological Defense Lab., San Francisco, Calif.
A METHOD FOR DETERMINING MISSION RE-ENTRY TIMES FOR FALLOUT-CONTAMINATED INDUSTRIAL COMPLEXES,
by H. Lee. 9 Mar 62, 25p. incl. illus. tables. (Rept. no. NRDL-TR-585)
Unclassified report

DESCRIPTORS: *Radiation hazards, *Mathematical prediction, *Radioactive fall-out, *Radiological contamination, Dose rate, Decontamination, Petroleum industry, Dosage, Radioactive decoy, Industrial plants.

Division 20 - NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

In the event of a nuclear war, knowledge of the time of availability, after contamination by fallout, for re-entry and use of certain resources is important in planning and preparing for the nation's recovery. This study is limited to the estimation of the availability time for industrial complexes that are not physically damaged by the attack or by emergency shut-down, but are inaccessible because of radiological contamination by fallout. A method of calculation proposed to be suitable for all industrial complexes was applied to 5 petroleum refineries. The findings were that the dose to decontamination personnel is the primary factor limiting re-entry and use. For the standard intensity range of 100 to 30,000 r/hr and dose limits of 30 r/24 hr, 230 r/2 wk and 1,000 r/yr, the mission re-entry time for the refineries studied ranged from 1 to 35 days. (Author)

AD-287 649 Div. 20, 8, 31
(TISTE/CAM) OTS price $16.00

Naval Radiological Defense Lab., San Francisco, Calif.
EFFECTS OF NUCLEAR RADIATION ON SHIPBOARD ELECTRONIC EQUIPMENT. 1. SOME EFFECTS OF SIMULATED TRANSIT RADIATION ON PARTS a. TRANSISTORS,
by H. A. Zagorites, E. A. Carr, and D. Y. Lee.
3 Aug 62, 246p. incl. illus. tables, 15 refs.
(Rept. no. NRDL-TR-577)
Unclassified report

DESCRIPTORS: *Electronic equipment, *Transistors, *Radiation damage, *Atomic bomb damage, Shipborne, Simulation, Gamma rays, Dosage, Electronic circuits, Measurements, Experimental data, Reliability, Vulnerability, Design, Nuclear warefare.

Twenty-six transistor types were irradiated in simulated transit radiation fields in the first phase of a study of nuclear radiation effects on shipboard electronic equipment. The results showed that satisfactory transistor circuit performance is probable where conservative circuit designs can be used. The tests were preceded by an evaluation of the nuclear warfare environment to estimate maximum radiation fields expected on combat effective ships. Fields based on these estimates were simulated with Co60 and provided a peak dose rate of about 250,000 r/hr and a dose of 13,100 r. A wide range was observed in the amount of radiation induced effects on beta and Ico. Temporary changes were observed, with silicon types exhibiting smaller effects. For germanium types, Ico was observed to change by a factor of 10-20 for some types while beta changed by a factor of 2 or less, with the change persisting in some types. Analyses failed to show any strong correlations, in general, between radiation induced effects and between these effects and preirradiation characteristics of the transistors. The results indicated that behavior of an individual transistor cannot be predicted satisfactorily from preirradiation measurements. Conservative circuit design and improvement of transistor performance during irradiation appear to be the best approach to the problem of equipment reliability. (Author)

AD-287 676 Div. 20
(TISTP/LMH) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
BREMSSTRAHLUNG SPECTRUM OF 260-MEV ELECTRONS,
by Yu. M. Ado, K. A. Belovintsev and others.
12 Sep 62, 10p. incl. illus. 14 refs. (Trans. no. FTD-TT-62-1174 from Atomnaya Energiya 12:3, pp. 193-197, 1962)
Unclassified report

DESCRIPTORS: *Electrons, *Photons, Scattering, Bremsstrahlung, Spectrophotometers, Nuclear reactions, Spectrographic analysis, Collimators, USSR.

The bremsstrahlung spectrum of 260-Mev electrons was measured experimentally with a 15-channel pair gamma-spectrometer. A considerable difference was observed between the experimental spectrum and Schiff's spectrum in the region of near-maximal photon energies. It has been shown that for thick targets of approx. 0.10 radiation units and thicker, it is necessary to take into account multiple photon radiation by a single electron. (Author)

AD-287 692 Div. 20
(TISTP/WH) OTS price $8.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
INTERNATIONAL ATOMIC ENERGY COMMISSION SYMPOSIUM ON RADIATION DECAY IN SOLIDS AND REACTOR MATERIALS.
8 Oct 62, 97p. incl. illus. tables, 15 refs.
(Trans. no. FTD-TT-62-818 from Simpozium Po Radiatsionnym Povrezhdeniyam V Tverdykh Telakh I Reaktornykh Materialakh Mezhdunarodnoye Agentstvo Po Atomnoy Energii, Venice, Italy, SM-25/75, 25/84, 25/85, 25/86, 25/87, 101p. 7-11 May 1962)
Unclassified report

DESCRIPTORS: *Radioactive decay, *Radiation damage, *Gamma rays, *Beta particles, *Neutrons, *Protons, *Uranium, *Intermetallic compounds, *Iron compounds, *Aluminum compounds, Solids, USSR, Symposia, Italy.

Contents:
Analogies in the radiational effects of nuclear radiations and streams of slow charged particles on solids
Internal friction in uranium,
Irradiation-induced relaxation ofelastic stresses in materials
Effects of neutron irradiation on the ordered alloy
The influence of neutron irradiation on the electrical resistance of certain metals

AD-287 724 Div. 20
(TISTB/SAT) OTS price $2.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
BULLETIN OF EXPERIMENTAL BIOLOGY AND MEDICINE (SELECTED ARTICLES),
10 Oct 62, 25p. incl. illus. 30 refs.
(Trans. no. FTD-TT-62-692 from Byulleten' Eksperimental'noy Biologii i Meditsiny 3:3, pp. 34-38, 109-112,112-116, 1962)
Unclassified report

DESCRIPTORS: *Biology, *USSR, *Radiobiology, Radiation effects, Radiaton injuries, Intestine, Cells, Serotonin, Laboratory animals, Medicine.

AD-287 849 Div. 20
(TISTP/TL) OTS price $8.10

Weizmann Inst. (Israel).
HIGH ENERGY INTERACTIONS OF COSMIC RAY PARTICLES: NUCLEAR EVENTS INDUCED BY HEAVY PRIMARIES AND THEORY OF MESON PRODUCTION IN HIGH ENERGY COLLISIONS.
Final technical rept.,
by Gideon Yekutieli. 30 Sep 61, 1v. incl. illus. tables, refs.
(Contract AF 61(052)371)
(AFCRL-1089) Unclassified report

DESCRIPTORS: *Cosmic rays, *Particles, *Nucleons, *Mesons, Theory, Excitation.

A theory of meson production in n-nucleus collisions based on the Fire Balls Models is developed. Nuclear events induced by heavy particles are analyzed and interpreted by a model of nucleus-nucleus collisions.

AD-287 863 Div. 20, 16
(TISTB/CCH) OTS price $3.50

American Machine and Foundry Co., Alexandria, Va.
SPACE RADIATION GUIDE.
Final rept., Oct 60-Mar 62 on Health Hazards of Materials and Radiation,
by W. P. Saylor, D. E. Winer and others. Aug 62, 210p. incl. illus. tables, refs.
(Contract AF 33(616)7631, Proj. 7165)
(AMRL TDR 62-86) Unclassified report

DESCRIPTORS: *Handbook, *Radiation hazards, *Solar energy, *Electromagnetic waves, *Thermal radiation, *Cosmic rays, *Van Allen radiation belt, *Space flight, Space medicine, Shielding, Electromagnetic shielding, Radioprotective drugs, Manned, Physiology, Instrumentation, Solar flares, Solar corona, Sunspots, Natural radioactivity, Geophysics, Space environmental conditions.

The Space Radiation Guide is intended to be a reliable, easily understood handbook that will provide the reader with sufficient knowledge of the nature of space radiations to permit him to comprehend the total space radiation problem as it pertains to the hazards of manned space flight. The report is not intended to provide answers to all the problems, but, instead, to present much of the factual data currently known and to point out areas where information is sketchy and inconclusive. The radiations considered are cosmic rays, solar radiation, and the geomagnetically trapped (Van Allen) radiations. Included are chapters on instruments used for measuring these radiations, on shielding techniques, and on biological effects. (Author)

AD-287 882 Div. 20
(TISTP/JW) OTS price $3.60

Air Force Special Weapons Center, Kirtland Air Force Base, N. Mex.
PROTONS IN THE OUTER ZONE OF THE RADIATION BELT,
by S. J. Bame, J. D. Conner and others. Oct 62, 31p. incl. illus. tables, 17 refs. (AFSWC-TDR-62-105)
(Proj. 7811)
Unclassified report

DESCRIPTORS: *Protons, *Radiation effects, *Van Allen radiation belt, Measurement, Spectrographic analysis, Intensity, Density, Energy, Ionospheric disturbances, Crystals, Instrumentation, Telemetering, Scintillation counters.

Measurements on the trapped protons in the outer zone of the Van Allen radiation belt were made on October 4, 1960, from a Scout rocket payload containing a two-crystal scintillation spectrometer. Protons with energies above 1 mev were detected, with the intensity rising above background at an altitude of 1,200 km. Representative intensities for 1 less than or equal to Ep less than or equal to 80 mev at 2,000, 3,000, 4,000, and 5,000 km, through a range of 37 deg N to 30 deg N geomagnetic latitudes, were 0.27, 0.90, 2.02, and 4.56 x 10 to the 5th power protons/sq cm-sec-ster. These intensities are averages for protons with pitch angles lying between 90 deg and approximately 60 deg. The proton energy spectrum at 5,000 km is J(E) = 2.0 x 10 to the 6th power E to the minus 5.2 protons/sq cm-sec-ster-mev for 1.02 less than or equal to Ep less than or equal to 2.24 mev, and J(E) = 0.71 x 10 to the 6th power E to the minus 3.9 for 2.24 less than or equal to Ep less than or equal to 7.3 mev. The pitch angle distributions for altitudes of 4,600 km and 5,150 km were also obtained for angles between 90 and 58 deg. There was no evidence of a proton intensity maximum coincident with the E2 maximum.

AD-287 889 Div. 20, 25
(TISTP/JW) OTS price $6.60

Army Electronics Research and Development Lab., Fort Monmouth, N. J.
NUCLEAR PULSE EFFECTS IN CABLES,
by Kurt Ikrath and Randolph Constantine. Aug 62, 62p. incl. illus. tables (AERADL technical rept. no. 2292)
Unclassified report

DESCRIPTORS: *Pulse cables, *Nuclear physics, Pulse transmitters, Circuits, Differential equations, Radiation effects.

An equivalent circuit for a piece of cable is developed and the differential equations of this circuit are solved under the conditions of a transient burst of nuclear radiation and under various ranges of cable bias voltage. Graphs of representative cases are presented and compared to experimental results. A method of solving for the transient change in cable parameters is given and sample calculations are shown. (Author)

21. NUCLEAR PROPULSION

No Entries

22. ORDNANCE

AD-286 987 Div. 22
(TISTM/TCG) OTS price $3.60

Picatinny Arsenal, Dover, N. J.
EVALUATION OF THE EFFECTS OF AGING ON M17 PROPELLANT,
by Louis Wiesenfeld and Marvin Goldstein.
July 62, 37p. incl. illus. tables (Technical rept. no. 3019)
Unclassified report

DESCRIPTORS: *Propellants, *Powders, *Aging, Effectiveness, Velocity, Pressure, Ballistics, Tests, Storage.

The effects of aging on M17 propellant for a one-year period are determined. The data from the closed bomb tests were studied to determine the storage effects of M17 propellant. The average relative quickness and relative force values obtained are listed. Empirical formulas were used to determine ballistic fluctuation which could occur within one year. Calculated velocity and pressure predictions are compared with Aberdeen Proving Ground Acceptance Firing Data. The average of differences between the actual and calculated velocities is 1.2%, and the average of differences between the calculated vs actual pressures is 5.8%. One sample shows a maximum velocity difference of 148.6 fps and a maximum pressure difference of 5011 psi. (Author)

AD-287 124 Div. 22, 13
(TISTB/LMH) OTS price $5.60

Army Engineer Research and Development Labs., Fort Belvoir, Va.
HEAVY, PUSHER-TYPE, MINE-CLEARING EXCAVATOR,
by L. E. Folk. 22 Aug 62, 45p. incl. illus. tables, 8 refs. (Technical rept. no. 1720-TR)
(Proj. 8-07-02-007)
Unclassified report

DESCRIPTORS: *Earth moving equipment, *Mine clearance, Bulldozers, Design, Production, Land mines, Disposal, Military operations.

A development program for a mobile V-type plow excavator to be used for minefield clearance is reported. The heavy, pusher-type, mine-clearing excavator is a huge and complex device designed to perform the gigantic job of continuously excavating all land-mines and soil to a depth of 3 feet from a path 14 feet wide at a speed of 3 mph. This amounted to excavating soil at a rate of approximately 30,000 cubic yards per hour. The most serious technical deficiency and cause of trouble centered around the electric wheel drive system. Although the general size of the excavator and the concept of furnishing needed power by means of fighting tank vehicles pushing in tandem were well known and acceptable to the Combat Arms at the initiation of development, changes in the world situation and military thinking combined to cause cancellation of the program on a basis of cost, complexity, and tactical employment. (Author)

AD-287 142 Div. 22
(TISTW/JRG) OTS price $5.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
EXPERIMENTAL OBSERVATIONS OF THE DYNAMIC BEHAVIOR OF LIQUID FILLED SHELL,
by B. G. Karpov. Aug 62, 56p. incl. illus. tables, 14 refs. (BRL rept. no. 1171)
(Proj. 503-03-009)
Unclassified report

DESCRIPTORS: *Small arms ammunition, *Bodies of revolution, *Projectiles, *Spin-stabilized ammunition, Damping, Yaw, Spin, Liquids, Canister projectiles, Chemical projectiles, Aerodynamics, Density, Viscosity, Mathematical analysis, Stability.

Experiments with a 20mm M56 shell whose cylindrical cavity, fineness ratio 2.7, was filled with different amounts of various liquids demonstrated the existence of dynamic instability for a broad range of loading conditions. It was found that, for water-like liquids, the nutational component of yaw is divergent when 40 to 90% of the cavity is filled. For Hg, the yaw is divergent from about 25 to 100%. The severity of instability or the rate of divergence of yaw increases with the increase in the specific gravity of the liquid. (Author)

AD-287 258 Div. 22
(TISTW/PCR) OTS price $1.60

Ballistic Research Lab., Aberdeen Proving Ground, Md.
CALCULATED PEAK PRESSURE-DISTANCE CURVES FOR PENTOLITE AND TNT,
by Ralph E. Shear and Edwin Q. Wright. Aug 62, 26p. incl. illus. tables, 14 refs. (BRL memo. no. 1423)
(Proj. 503-04-002) Unclassified report

DESCRIPTORS: *Explosives, *Shock waves, Pentolite, TNT, Pressure, Air blast, Mathematical analysis, Equations, Theory, Shock, Propagation.

The Kirkwood-Brinkley shock propagation theory is used to obtain peak pressure-distance curves for Pentolite and TNT. The curve for Pentolite obtained by using the calculated initial pressure and flow energy at the charge surface as initial values is in excellent agreement with experiment for distances greater than 1.75 charge radii. The curve for TNT obtained by using some approximate values of the peak pressure and energy at the charge surface is in excellent agreement with some recent free-air blast measurements. The curve is also compared with Brode's calculated pressure-distance curve. (Author)

AD-287 294 Div. 22, 12
(TISTW/PCR) OTS price $4.60

Air Force Office of Scientific Research and Development, Washington, D. C.
A PROPOSED IMPROVEMENT IN OPTIMIZATION TECHNIQUES FOR N-STAGED ROCKETS.
Report on System Synthesis and Analysis,
by H. Palmer Hotz and A. V. Houghton, II.
July 62, 42p. incl. illus. 21 refs. (Rept. no. AFOSR/DRA 62-14)
(Proj. 5101)
Unclassified report

DESCRIPTORS: *Rockets, *Staging, Theory, Mathematical analysis, Equations, Energy, Velocity, Fuel consumption, Computer logic.

In the design of multistaged rockets, an essential feature is the optimization of the stages. This report is a comparison of the methods of Weisbord and Schurmann and the derivation of a new optimization procedure based on the energy rather than upon velocity as in earlier works. The numerical results of this

method are compared with those of the earlier papers and it is shown that higher payload energies may be obtained for a given expenditure of fuel when the method of this report is used. Future refinements and improvements are suggested. (Author)

AD-287 459 Div. 22
(TISTW/PCR) OTS price $1.60

Miller Research Labs., Baltimore, Md.
PRODUCTION COMPONENTS FOR CARTRIDGE, 81 MM ILLUMINATING, T214E2.
Monthly progress rept., 1-30 Sep 62,
by E. R. Briggeman. 10 Oct 62, 9p. incl. illus.
(Rept. no. PR-251-9-62)
(Contract DA 36-034-ORD-3468)
Unclassified report

DESCRIPTORS: *Mortar shells, Plastics, Tails, Design, Tests, Production, Parachutes, Ballistics, Drafting, Illuminating projectiles.

AD-287 556 Div. 22
(TISTW/PCR) OTS price $4.60

Franklin Inst., Philadelphia, Pa.
RECOILLESS RIFLE TECHNICAL INFORMATION INDEX (1958-1962).
Sep 62, 1v. (Pub. bull. no. 8, suppl. 1)
(Contract DA 36-034-507-ORD-314)
Unclassified report

DESCRIPTORS: *Recoilless rifles, *Bibliography, Antitank ammunition, Antitank guns, Indexes, Guns, Ammunition, Projectiles, Armor piercing ammunition, Fuzes, Ballistics, Tests, Propellants, Exterior ballistics, Terminal ballistics, Interior ballistics, Nuclear warheads, Rocket propellants, Rockets, Rocket fuzes, Rocket launchers, Shaped charges, Howitzers.

The Recoilless Rifle Technical Information Index is an index to reports and articles pertaining to the field of recoilless rifles. It is based on a master set of border punched cards, which are coded and notched for needle sorting of key information. Except for the coding, all data are reprinted in the Index. The original Index is designated PB8 (AD-235 535); it covered the period 1944-1958, and has 1142 citations. (Author)

AD-287 586 Div. 22
(TISTW/PCR) OTS price $1.60

Army Armor Board, Fort Knox, Ky.
EVALUATION OF RECOIL EXERCISER VALVE FOR M60 SERIES TANKS.
12 Oct 62, 11p. incl. illus. (Proj. 2203-1)
Unclassified report

DESCRIPTORS: *Recoil mechanisms, Tests, Reliability, Maintenance, Human engineering, Photographs, Tanks.

Tests were made on a recoil exerciser valve to determine its suitability for use in the M60 series tank. It was evaluated with respect to functioning, durability, reliability, maintenance, and human factors engineering. The US Army Armor Board concluded that: (1) the recoil exerciser was suitable for Army use and (2) the advantages to be gained by installing the recoil exerciser valve on all M60 series tanks outweigh the disadvantages.

AD-287 605 Div. 22
(TISTA/SEB) OTS price $3.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
A THEORETICAL ANALYSIS OF THE AXIAL SPIN DECAY OF A SPIN-STABILIZED LIQUID-FILLED SHELL,
by W. E. Scott. Aug 62, 40p. incl. illus. 7 refs.
(BRL rept. no. 1170)
(Proj. 503-03-001)
Unclassified report

DESCRIPTORS: *Spin stabilized ammunition, *Projectiles, Liquids, Torque, Equations, Motion, Spin, Resistance, Velocity, Rotation, Reduction, Theory, Differential equations, Integral equations, Mathematical analysis, Bodies of revolution, Damping.

The Navier Stokes equations are used to arrive at the laminar viscous torque exerted by a liquid on the walls of a liquid-filled spinning shell in flight. The equation of motion for the axial spin of the liquid-filled shell is then derived and solved. The result does not agree with the experimental observations of spin decay, and the possible causes for disagreement are discussed. (Author)

AD-287 608 Div. 22
(TISTW/PCR) OTS price $1.60

Scintilla Magneto Div., Bendix Corp., Sidney, N.Y.
SQUIB DEVELOPMENT PROGRAM FOR THE U. S. NAVAL WEAPONS LABORATORY, DAHLGREN, VIRGINIA.
Quarterly technical progress rept. no. 1, 30 June-30 Sep 62,
by Rolland M. Purdy, Sr. 30 Sep 62, 11p. incl. illus. tables.
(Contract N178-8081)
Unclassified report

DESCRIPTORS: *Electric detonators, *Electric igniters, Spark ignition, Impedance, Semiconductors, Copper compounds, Oxides, Ceramic materials, Tests, Radiofrequency power, Design, Iron compounds, Nickel compounds, Carbonyl radicals, Glass, Calcium compounds, Silicates, Tin compounds, Zinc compounds, Drafting.

The design and development of an electro-explosive device is presented, embodying a spark gap bridged by a high impedance semi-conductor material in such a manner as to render the device immune to stray radiofrequency energy. The basic objectives to be attained and preliminary approaches and test results are discussed.

AD-287 641 Div. 22
(TISTW/PCR) OTS price $1.10

Little, Arthur D., Inc., Cambridge, Mass.
SENSITIVITY OF CASED EXPLOSIVE MATERIALS TO IMPACT BY REGULAR FRAGMENTS.
Progress rept. no. 5, 29 June-29 July 62.
31 July 62, 6p. incl. table.
(Contract DA 19-020-ORD-5617)
Unclassified report

DESCRIPTORS: *Explosives, *Propellants, Fragmentation, Impact shock, Storage, Velocity, Thickness, Propellant tanks, Projectile cases, Calibration, Tests, Sensitivity.

An experimental program dealing with the sensitivity of certain cased explosives and propellants to impact by regular fragments is described. The program is designed to aid in determining a more realistic quantity-distance relationship for the storage of ordnance explosive material. It is the intent of this project, through an experimental program, to estab-

lish a limmmiting fragment mass vs impact velocity relationship for the detonation of certain explosives and/or propellants enclosed in casings of different thicknesses. This report discusses calibration firings, velocity screen design, and evaluates additional tests conducted. (Author)

AD-287 642 Div. 22
(TISTW/PCR) OTS price $1.10

Little, Arthur D., Inc., Cambridge, Mass.
SENSITIVITY OF CASED EXPLOSIVE MATERIALS TO IMPACT BY REGULAR FRAGMENTS.
Progress rept. no. 6, 31 July 31 Aug 62.
31 Aug 62, 3p. table.
(Contract DA 19-020-ORD-5617)
Unclassified report

DESCRIPTORS: *Explosives, *Propellants, Fragmentation, Impact shock, Storage, Velocity, Thickness, Propellant tanks, Projectile cases, Calibration, Tests, Sensitivity.

An experimental program dealing with the sensitivity of certain cased explosives and propellants to impact by regular fragments is described. The program is designed to aid in determining a more realistic quantity distance relationship for the storage of Ordnance explosive material. It is the intent of this project, through an experimental program, to establish a limiting fragment mass vs impact velocity relationship for the detonation of certain explosives and/or propellants enclosed in casings of different thicknesses. This report discusses calibration firings, fragment velocity determination, and additional tests conducted. (Author)

AD-287 703 Div. 22
(TISTW/RD) OTS price $22.25

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
BOMBING,
by V. I. Kirillov. 28 Sep 62, 419p. incl. illus. tables (Trans. no. FTD-TT-62-235 from Voyennoye Izdatel'stvo Ministerstva Oborony Soyuza SSR Moskva, 1960)
Unclassified report

DESCRIPTORS: *Bombing, Exterior ballistics, Bomb trajectories, Bombsights, Errors, Optical sights, Night bombing, Toss bombing, Dive bombing, USSR.

The book considers the theoretical foundations of bombing and the execution of bombing from horizontal and nonhorizontal flight, gives experimental data on the theory of probability, and provides a basis for evaluation of the effectiveness of bombing operations. The book is intended for use by the crews of all types of aircraft. It may also be found useful for cadets in the military aviation schools of the Air Force and the DOSAAF aviation clubs. (Author)

AD-287 796 Div. 22
(TISTW/PCR) OTS price $3.60

Army Missile Command, Redstone, Arsenal, Huntsville, Ala.
DEVELOPMENT AND FUNCTIONAL CHARACTERISTICS OF THE XM8 SQUIB,
by R. E. Betts and W. P. Williams. 26 Oct 62, 33p. incl. illus. (Rept. no. RK-TR-62-6)
Unclassified report

DESCRIPTORS: *Electric detonators, *Electric igniters, Specifications, Test methods, Design, Safety, Photographs, Hazards, Radiofrequency, Ignition.

This report covers the development of the XM8, an exploding bridge wire type squib. This squib offers extreme protection against the hazards of accidental ignition from extraneous energies from radio-frequency, electrostatic and induced high currents. Presented are test procedures and data, squib design, and squib performance characteristics. (Author)

23. PERSONNEL AND TRAINING

AD-287 269 Div. 23, 30
(TISTB/LMH) OTS price $1.10

6570th Aerospace Medical Research Labs., Aerospace Medical Div., Wright-Patterson Air Force Base, Ohio.
A REVIEW OF SCORING METHODS FOR TRACKING TASKS,
by George G. Frost. Oct 62, 3p. incl. illus. 2 refs. (AMRL memo. no. P-14)
Unclassified report

DESCRIPTORS: *Tracking, *Training devices, Errors, Measurement, Analysis of variance, Electronic equipment, Electronic circuits, Tests.

A study was conducted to determine what scoring circuits would be appropriate for use in measuring tracking accuracy for the Dyna-Soar (X-20) boost simulation program. The results and discussion are generalizable to most tracking experiments. (Author)

AD-287 801 Div. 23
(TISTB/MD) OTS price $3.60

Amarillo Technical Training Center (ATC), Amarillo Air Force Base, Tex.
FOLLOW-UP STUDY OF RESTOREES OF THE 3320TH RETRAINING GROUP.
Semi-annual rept., July-Dec 60.
Oct 62, 27p. tables.
Unclassified report

DESCRIPTORS: *Training, *Military training, Military psychology, Aviation personnel, Effectiveness.

24. PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES

AD-287 531 Div. 24, 8
(TISTA/VGW) OTS price $.75

Directorate of Materials and Processes, Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
AN ELECTRONICALLY CONTROLLED HIGH SPEED STREAK CAMERA.
Final rept., Sep 59-June 61 on Chemistry and Physics of Materials,
by O. Van P. Sessoms, III and Thomas W. Bailey.
July 62, 21p. incl. illus. 4 refs.
(Proj. 7360)
(ASD TDR 62-596) Unclassified report

DESCRIPTORS: *High speed cameras, *Rotating mirror cameras, Rotating structures, Magnetic drives, Magnetic fields, Bearings, Design, Electronic equipment, Control systems.

The design and development of an electronically

controlled high speed streak camera is described. The camera employs a magnetic suspension and drive mechanism which allows a prismatic mirror to be suspended without friction in a magnetic field and to be driven to extremely high rotational velocities. This provides the streak camera with a time resolution and controllability which could not be achieved by more conventional means. The design, development, and initial operation are described, but no performance data is available as technical and administrative problems forced termination of the project before it could be completed. (Author)

AD-287 607 Div. 24, 2
(TISTA/VGW) OTS price $3.60

Ballistic Research Labs., Aberdeen Proving Ground, Md.
THE DEVELOPMENT OF AN AERIAL CAMERA WITH CELESTIAL ORIENTATION,
by Donald F. Menne. Aug 62, 41p. incl. illus.
(BRL memo. no. 1425)
(DA Proj. 503-06-011)
Unclassified report

DESCRIPTORS: *Aerial cameras, Astronomical cameras, Sun, Geodetic data, Position finding, Ground position indicators, Photographic lenses, Camera shutters, Mapping, Celestial navigation, Design.

An aerial camera system which records an image of the sun or other celestial object simultaneously with a terrestrial photograph was developed. The addition of precise astronomical measurements serves to counteract the unfavorable accumulation of errors in the determination of orientation parameters for extended aerial triangulations. The camera has two 100-mm focal length, f/5.6 lenses incorporated in a camera body in such a way that the respective fields of view are diametrically opposed. A pulse operated shutter system provides synchronization of exposures within .001 second for exposure durations of .010, .005, .003 or .002 second. The occurrence of exposure is determined to .050 second as part of the astronomical measurements. (Author)

25. PHYSICS

AD-286 910 Div. 25
(TISTP/WH) OTS price $3.60

Republic Aviation Corp., Farmingdale, N. Y.
A SUPERSONIC PLASMA BEAM,
by Herbert Malamud and Benjamin Bederson.
June 61, 1v. incl. illus. 15 refs. (Rept. no. PPL-TR-61-17(398))
(Contract AF 49(638)552)
(AFOSR-1429) Unclassified report

DESCRIPTORS: *Plasma physics, *Ionization, *Supersonic nozzles, *Alkali metals, *Vapors, *Laboratory equipment, *Cesium, *Potassium, Wind tunnels.

The theory and design of a cold plasma beam facility are described. A supersonic beam of alkali metal vapor is produced by conventional wind tunnel techniques. The vapor is ionized to a high degree by the process of surface ionization on the heated (tungsten) walls of the acceleration nozzle, which also acts as an electron emitter to provide charge neutralization in the beam. The limitation on the plasma flux is the effect of particle recombination in the non-equilibrium situation existing in the nozzle. Estimates based on the presently available data on recombination rates give a maximum beam flux of 10 to the 17th power ion/sq cm-sec. (Author)

AD-286 919 Div. 25
(TISTM/ODN) OTS price $1.60

Western Reserve U., Cleveland, Ohio.
MEAN LIVES OF POSITRONS IN AQUEOUS SOLUTIONS,
by Jerome E. Jackson and John D. McGervey.
1962, 10p. illus. table.
(Contract AF 49(638)760)
Unclassified report

DESCRIPTORS: *Positrons, *Solutions, *Water, Oxidation, Ions, Reaction kinetics, Permanganates, Iodates, Mercury, Positronium, Lead compounds, Perchlorates, Chlorides, Radioactive decay, Nitrates.

By measurement of the time distribution of positron annihilations in aqueous solutions, reaction rates for oxidation of positronium by the ions MnO4, IO3, and Hg have been determined. In strong oxidizing solutions the mean life of the positrons reaches a lower limit of 4.3 x 10 to the -10th power sec; the short lifetime in water was measured and found to agree with this value. A Pb(ClO4)2.3H2O solution reduced the intensity I2 with no significant change in the long mean life, an effect previously observed in nitrate solutions. This may mean that in these two cases oxidation can occur before Ps is thermalized but not afterwards. The decay distributions from a mixture of Hg and MnO4 ions in solution and the Hg ion in separate solutions with Cl and ClO4 ions indicated an association taking place between the negative and positive ions. (Author)

AD-286 924 Div. 25
(TISTP/TL) OTS price $8.60

Air Force Inst. of Tech., Wright-Patterson Air Force Base, Ohio.
AN INVESTIGATION OF THE APPLICATION OF THE MOSSBAUER EFFECT TO ACCELEROMETERS USED FOR INERTIAL NAVIGATION,
Master's thesis,
by Jack E. Hesse, Jr. Aug 62, 77p. incl. illus. tables, 32 refs. (Rept. no. GA/Phys/62-7)
Unclassified report

DESCRIPTORS: *Accelerometers, *Nuclear magnetic resonance, *Absorption, Inertia navigation, Radioactive isotopes, Temperature, Acceleration, Magnetic effects.

An analytical investigation of the application of the Mossbauer Effect to accelerometers is presented. The Mossbauer Effect is the emission and absorption of gamma photons without energy losses due to the recoil of the emitting and absorbing nuclei. Resonant absorption so obtained is sensitive to changes in photon energy of one part in 10 to the 12th power - 10 to the 15th power. Fundamental limitations in the application of this phenomenon are the need for statistical counting of photons and the uncertainty in the energy of the nuclear gamma decay. An order of magnitude analysis indicates that the isotope Fe(57), which has favorable characteristics such as a relatively high cross section for resonant absorption and a relatively high ratio of photon energy to uncertainty in photon energy (3 x 10 to the 12th power), is the best available isotope. The Mossbauer Effect is most sensitive to a shift in energy due to relative velocity between the source and absorber, allowing sensing of velocities of 1/100 - 1/100,000 cm/sec. Techniques are presented and analyzed that use the latter phenomenon to measure angular and linear velocity and angular position of instrument components. (Author)

AD-286 925 Div. 25, 20
(TISTP/JW) OTS price $7.60

Air Force Inst. of Tech., Wright-Patterson Air Force Base, Ohio.
AN INVESTIGATION OF THE USE OF RADIATION FROM RADIOISOTOPES TO MEASURE DENSITY ALTITUDE.
Master's thesis,
by Alexander Kratz Rupp. Aug 62, 70p. incl. illus. 20 refs. (Rept. no. GA/Phys/62-13)
Unclassified report

DESCRIPTORS: *Radiation effects, *Isotopes, *Radioactive isotopes, *Altimeters, Theses, Density, Beta particles, Scattering, Altitude chambers.

All known methods that obtain density altimetry from the radiation of radioisotopes are reviewed and the results of testing one of the methods, small-angle-beta scatter, in an altitude chamber, is reported. The range of density altitude to be measured is from 100,000 to 300,000 ft, and within this range the small-angle-beta-scatter altimeter proves to offer a satisfactory theoretical solution. After small angle scatter in air occurs, the beta radiation is re-collimated and detected by an anthracene scintillating crystal and associated electronic equipment. The count rate of the apparatus is a decreasing function with increasing altitude, and it is this observation that makes the small-angle-beta-scatter gage useful as an altimeter. Testing showed that final results in an altitude chamber provide readable data from 100,000 to 210,000 ft. In the conclusion it is noted that the small-angle-beta-scatter-density altimeter is especially suitable for mounting in hypersonic aircraft because it samples ambient air, requires no compressibility corrections, and can be located in fuselage areas of relatively low temperature that require no special protection. (Author)

AD-286 927 Div. 25, 7, 30
(TISTM/EJH) OTS price $8.10

Air Force Inst. of Tech., Wright-Patterson Air Force Base, Ohio.
ENERGY BALANCE OF A WHIRL STABILIZED HYDROGEN ARC.
Master's thesis,
by Thomas E. Reinhardt. July 62, 59p. incl. illus. tables, 8 refs. (Rept. no. GNE/Phys/62-15)
Unclassified report

DESCRIPTORS: *Gas discharges, *Electric discharges, *Electric arcs, Energy, Ethalpy, Electrodes, Gases, Hydrogen, Water, Plasma physics, High temperature research, Heating, Copper electrodes.

A whirl stabilized hydrogen arc existed in a transparent vycor tube between flat copper electrodes, each having axial gas discharge holes. The purpose of this investigation was to make an energy balance on this arc by the method of water calorimetry. The total energy balance revealed questionable stability below 90 amperes. A marked hysteresis was observed between 60 and 90 amperes by varying chamber pressure. The initial increase of power at constant pressure led to a positive voltage-current characteristic. Enthalpy ranged from 30,000 to 70,000 BTU/lb. Efficiency varied from 80 to 90%. Electrode losses were optimized by decreasing the cathode discharge hole diameter. Suggestions for improvements leading to higher enthalpy, stability, and lifetime are included. (Author)

AD-286 934 Div. 25
(TISTE/CRJ) OTS price $10.10

Electro-Optical Systems, Inc., Pasadena, Calif.
INVESTIGATION OF HOLLOW REPLICA CORNER PRISMS.
Final rept.,
by D. H. McClelland. 30 July 62, 113p. incl. illus. tables, 7 refs. (EOS rept. no. 1931)
(Contract DA 04-495-ORD-3332)
Unclassified report

DESCRIPTORS: *Prisms (Optics), *Optical instruments, Optics, Mirrors, Adhesives, Resins, Theory, Stresses, Processing, Electroforming, Coatings, Surface properties, Fire control.

Investigations were made of hollow replica corner prisms (1) to improve the state of the art of optics replication, (2) to demonstrate this improved art by making, on a laboratory basis, replica corner prisms which are comparable in accuracy and stability to currently manufactured glass prisms, (3) to establish process control factors involved in the mass production of replica prisms, and (4) to establish the feasibility of developing the process for the replication of other types of optical elements. The scope of the program includes the study of plane mirrors as a means of isolating and investigating important replication factors. (Author)

AD-286 957 Div. 25
(TISTM/TCG) OTS price $1.10

Mississippi U., University.
SOUND ABSORPTION AND VELOCITY MEASUREMENTS IN OXYGEN.
Technical report on Thermal Relaxation Processes in Gases,
by F. D. Shields and K. P. Lee. 22 Oct 62, 4p. illus.
(Contract Nonr-307800)
Unclassified report

DESCRIPTORS: *Oxygen, *Sound, *Absorption, *Velocity, Measurement, Relaxation time, Vibration, Energy, Test methods, Sound transmission.

The tube method was used to measure sound absorption and velocity in pure O2 at 23.5, 208.7 and 301.3 C. At the elevated temperatures the absorption was in excess of the classical value. This was attributed to thermal relaxation of the vibrational energy. At 208.7 and 301.3 C, the peak value of the relaxation absorption curve is estimated to fall at 100±4 and 175±13 cycles/sec/atm, respectively. These values correspond to relaxation times of 1.71 x 10 to the -3rd power and 1.01 x 10 to the -3rd power sec and are considerably longer than would be expected by interpolation from previous data at higher and lower temperatures. (Author)

AD-286 981 Div. 25
(TISTM/EJH) OTS price $8.10

Laboratory for Insulation Research, Mass. Inst. of Tech., Cambridge.
(No title)
Progress rept. no. 31,
July 62, 82p. incl. illus. tables, refs.
(Contract Nonr-184110, Nonr-184188 and others)
Unclassified report

DESCRIPTORS: *Dielectrics, *Ferroelectric crystals, *Single crystals, *Crystals, Masers, Thin films, Growth, Dielectric properties, Electrical properties, Ceramic materials, High pressure research, High temperature research, Magnetic properties, Garnets, Alkaline earth compounds, Alkali metal compounds, Titanates, Halides, Titanium compounds, Dioxides, Spectrographic analysis, Mass spectroscopy, Interferometers.

Contents:
High-dielectric-constant materials

High-temperature dielectrics
Breakdown, field emission, dielectric and elastic spectroscopy
Crystal physics
Magnetics
Mathematical crystallography
Magnetic spectroscopy
Optical modulation

AD-286 982 Div. 25, 4
(TISTM/TCG) OTS price $2.60

Laboratory for Insulation Research, Mass. Inst. of Tech., Cambridge.
THE TRAPPING OF ELECTRONS AND HOLES IN MIXED CRYSTALS,
by Nelson C. Maynard. Sep 62, 26p. incl. illus. tables, refs. (Technical rept. no. 171)
(Contract AF 19(604)8483)
Unclassified report

DESCRIPTORS: *Crystals, *Color centers, *Potassium compounds, *Rubidium compounds, *Electrons, Solids, Solutions, Optical analysis, Absorption, Alkali metals, Halides, Chlorides, Bromides, Electron beams, Growth, Low temperature research, Intensity, Lattices.

Electrons and holes were produced in mixed crystals of KCl-KBr and KCl-RbCl solid solution systems by irradiation with 3-Mev electrons at -190, -80, and 20 C with doses 10 to the 5th power to 10 to the 6th power rads. The optical absorption resulting from the trapping of electrons and holes was measured by -190 C (liquid-N temperature) to reduce bleaching. The mixed crystals of KCl-KBr and KCl-RbCl irradiated at liquid-N temperature contained F, F', K, and V sub 1 centers. The F and K centers appeared at -80 C while at 20 C irradiations, the F, K, and M bands were observed. The Mollwo relation is not valid for the shift of the maximum of all bands observed, possibly because of lattice distortion. The half-width of the F band is greater in mixed crystals. The V sub 1 band half-width in the KCl-RbCl system decreases contrary to that in KCl-KBr. Intensity of the F band-versus-composition curves for KCl-KBr exhibit both a relative maximum and a relative minimum, but in KCl-RbCl only a deep minimum. (Author)

AD-286 989 Div. 25, 14
(TISTM/ODN) OTS price $1.60

Servo Corp. of America, Long Island, N. Y.
INVESTIGATION OF LONG WAVELENGTH INFRARED GLASSES.
Interim engineering rept. no. 2, 15 July-15 Oct 62,
by C. J. Billian. 22 Oct 62, 13p. incl. tables.
(Contract AF 33(657)8560)
Unclassified report

DESCRIPTORS: *Infrared optical materials, *Glass, *Infrared transmitters, Intermetallic compounds, Selenides, Arsenic compounds, Silver, Arsenic, Selenium, Bismuth, Tellurium, Cadmium, Germanium, Antimony, Melting, Copper, Crystals, Absorption, Refractive index, Coatings.

Information on IR transmitting glasses is presented which consists of composition-property data obtained on new glasses selected from the As-Se-Te field. Part I (of 2 parts) is a property measurement section to determine certain optical, thermal, and physical properties on 20 different glass compositions. The glasses were melted and property measurements include: IR transmittance from 16 to 25 microns, absorption coefficient from 2 to 25 microns, refractive index and dispersion from 16 to 25 microns at 0.5 micron intervals, anti-reflection coating evaluation from 8 to 13 microns, thermal shock resistance, and resistance to nuclear radiation. Part II consists of a composition study with the objective of developing new, improved glasses having transmittance to beyond 16 microns. (Author)

AD-287 037 Div. 25, 8
(TISTP/MS) OTS price $2.60

Cruft Lab., Harvard U., Cambridge, Mass.
A NEW TECHNIQUE FOR MEASURING AN ELECTROMAGNETIC FIELD BY A COIL SPRING,
by Keigo Iizuka. 19 June 62, 18p. illus. table, 17 refs. (Technical rept. no. 365)
(Contract Nonr-186632, Proj. NR 371-016 and Grant no. 9721)
Unclassified report

DESCRIPTORS: *Electromagnetic fields, Vibration, Coils, Antennas, Dipole antennas, Test methods, Springs, Measurement.

A thin coil spring whose length can be varied periodically by mechanical means was used as a probe to measure the electric field intensity. The vibrating probe acts as a re-radiating antenna with periodically varying length that modulates and scatters the component of the E field which is parallel to the axis of the spring. The scattered signal is picked up by a receiving antenna (the sending antenna was used also as a receiving antenna) and amplified with an amplifier that is locked-in with the frequency of the mechanical vibration of the coil. Measurements were made with coil springs of 3 different dimensions, and a gain constant K, which should be independent of the product of the axial length of the coil and the magnitude of the vibration, was experimentally checked. Measurements of the field of a half-wave dipole antenna as measured with the spring probe are in general agreement with theory. An expression for the gain of the system is obtained based upon the field-pattern method, and the approximations involved in the reciprocity-theorem method are clarified. It is also demonstrated that the effective length of a thin helical antenna equals the axial length of the helix. (Author)

AD-287 042 Div. 25
(TISTM/TCG) OTS price $1.60

Polytechnic Inst. of Brooklyn, N. Y.
CREEP ANALYSIS OF COMPRESSIBLE CIRCULAR PLATES,
by Sharad A. Patel, F. A. Cozzarelli, and B. Venkatraman. Aug 62, 11p. illus. tables, 6 refs. (PIBAL rept. no. 657)
(Grant no. AF-AFOSR 62-200)
Unclassified report

DESCRIPTORS: *Cylindrical bodies, *Sheets, *Creep, *Mathematical analysis, Stresses, Moments, Reflection, Differential equations, Theory, Dynamics.

A creep bending analysis of compressible circular plates is presented. The analysis is based on an iterative procedure applicable in general to such plates subjected to radially symmetric lateral loads. Solutions for moments and deflections are obtained for simply supported and clamped edge circular plates under uniformly distributed loads. (Author)

AD-287 056 Div. 25, 30, 31
(TISTM/EJH) OTS price $6.60

General Dynamics/Electronics, Rochester, N. Y.
STUDY OF UNDERWATER ACOUSTIC ABSORBERS.

Final rept.,
by R. A. Rubega and E. I. Prasse. 15 Mar 62, 69p. incl. illus. tables, 13 refs.
(Contract Nonr-264600)
Unclassified report

DESCRIPTORS: *Underwater sound, *Acoustic insulation, Damping, Reflection, Vibration, Absorption, Sound, Vibration isolators, Metal plates, Sound transmission, Laminates, Hydrophones, Test methods, Steel, Aluminum, Plastics, Rubber.

A theoretical and experimental study of possible new methods of underwater sound absorption in the frequency range from 2 to 10 kc was made. Four methods of determining sound absorption were considered: (1) measurment of the flexural vibration of damped plates under excitation by an incident sound wave; (2) measurement of decay time in a small-scale reverberation tank; (3) measurement of direct echo reduction in a full-scale sonar tank; and (4) energy accounting techniques, both in air and under water. With Method (1), it was found that no direct indication of flexural motion could be observed for the plates tested with the pickup and instrumentation used. Under Method (2), qualitative comparisons of various absorbing materials are presented. Under Method (3), results were obtained for a forest type of absorber system consisting of neoprene strips; while under Method (4), results are given for one type of absorbing plate. Limitations and possible sources of error for all methods are discussed. (Author)

AD-287 095 Div. 25
(TISTP/WH) OTS price $3.60

Aerospace Corp., Los Angeles, Calif.
SLOW FLOW OF A DISSOCIATED GAS ABOUT A CATALYTIC PROBE: A TECHNIQUE OF MEASURING CATALYTIC EFFICIENCIES OF SURFACES AND DIFFUSION COEFFICIENTS OF A DISSOCIATED GAS,
by R. A. Hartunian and S. W. Liu. 20 July 62, 32p. incl. illus. 11 refs. (Rept. no. TDR-69 (2230-06)TN-3)
(Contract AF 04(695)69)
(DCAS TDR 62-147) Unclassified report

DESCRIPTORS: *Gas flow, *Dissociation, *Catalysts, *Recombination reactions, *Heat transfer, Instrumentation, Gages.

A solution to the problem of the flow at low Reynolds number of a dissociated gas about a catalytic probe was obtained using the method of inner and outer expansions. The solution gives the atom concentration distribution about the probe as a function of the Reynolds number based on diffusion and the parameter $K = k' a/D$ where k' is the effective speed of the surface reaction, D is the diffusion coefficient, and a the radius of the probe. It is shown that, from a measurement of the heat transfer to the probe and an independent measurement of the free-stream atom concentration, one can establish the catalytic efficiency of the surface when $K \ll 1$ and the diffusion coefficient when $K \gg 1$. Conversely, knowing either the diffusion coefficient or the catalytic efficiency, the probe may be used to determine atom concentrations. The results of the theory are used to establish experimental conditions in a glow discharge facility under which the sought data may be obtained. Plots of valid operating regimes of this facility are presented. (Author)

AD-287 128 Div. 25
(TISTP/WH) OTS price $1.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
SPECTROGRAPHIC INVESTIGATION OF TEMPERATURES IN A PLASMA JET ARC TUNNEL,
by Seymour Lader. Apr 62, 9p. illus. 11 refs.
(Technichal memo. no. 1001)
(DA Proj. 5N-12-15-031)
Unclassified report

DESCRIPTORS: *Spectrographic analysis, *Plasma jets, *Temperature, *Gas ionization, *Copper, *Atomic spectrum, Wind tunnels, Measurement.

Spectrographic equipment was assembled and is being used to study the plasma jet air stream. The ionization temperature in a free stream plasma jet, 3 in. from the nozzle, was measured with this equipment. Assuming a Boltzman distribution and using the ratio of the intensity of two copper lines, a temperature of 6200 K was calculated. (Author)

AD-287 143 Div. 25
(TISTP/JW) OTS price $3.60

Brown U., Providence, R. I.
THE VISCOSITY OF SUPERHEATED STEAM UP TO 275 C. A REFINED DETERMINATION,
by J. Kestin and P. D. Richardson. Sep 62, 31p. incl. illus. tables, 10 refs. (Technical rept. no. BRN-1-P)
(In cooperation with James Forrestal Research Center, Princeton U., N. J., Contract Nonr-185825, Proj. NR-098-038)
Unclassified report

DESCRIPTORS: *Viscosity, *Steam, Measurement, Density, Temperature, Thermal diffusion.

A series of measurements is described made with an oscillating disk viscometer of the viscosity of superheated steam. These measurements were made on 8 isotherms, ranging from 148 to 275 C, and thus go to a temperature higher than previously achieved with steam in this type of instrument. The measurements again show that in the range of temperature investigated the viscosity of superheated steam decreases with increasing density. The precision of the present measurements has permitted a simple correlation to be made of the effect of temperature and density upon the viscosity. From this it now appears that the temperature at which the density effect ceases to be negative is about 315 C. The correlation of the results is presented. (Author)

AD-287 145 Div. 25
(TISTM/TCG) OTS price $2.60

Aeronautical Research Associates of Princeton, N. J.
A NEW APPROACH TO NON-EQUILIBRIUM STATISTICAL MECHANICS OF GASES,
by J. E. McCune, G. Sandri and E. A. Frieman. Sep 62, 17p. (Technichal rept. no. ARAP-4-P)
(In cooperation with James Forrestal Research Center, Princeton U., N. J., Contract Nonr-185825, Proj. NR-098-038)
Unclassified report

Presented at the Third Symposium on Rarefied Gas Dynamics during the week of 26 June 1962, at Paris.

DESCRIPTORS: *Gases, *Mechanics, *Statistical analysis, *Chemical equilibrium, Kinetic theory, Equations of state, Relaxation time, Theory.

A new technique for the study of multiple-time relaxation processes is applied to the case of a short-range (neutral) dilute gas. A virial expansion of the BBGKY hierarchy is combined with an expansion of the time derivative in such a

way that explicit account is taken of both the fast and slow processes occurring. This expansion is made definite by the removal of secular terms on the fast time scale; the first condition for the removal of such secularities is Bogolubov's form of the Boltzmann equation. Generalized conditions for the attainment by a gas of such a kinetic stage are given. The difficulty of generalizing the kinetic equation to allow for three-body effects is discussed in the light of new developments. (Author)

AD-287 146 Div. 25
(TISTM/RGR) OTS price $6.60

Air Force Inst. of Tech., Wright-Patterson Air Force Base, Ohio.
THE EFFECT OF TWO MEV DEUTERON AND PROTON RADIATION ON THE CONDUCTIVITY IN N-TYPE GERMANIUM DENDRITE CRYSTALS.
Master's thesis,
by Ralph H. Jacobson. Aug 62, 55p. incl. illus. tables, 11 refs. (Rept. no. GA/Phys/62-9)
Unclassified report

DESCRIPTORS: *Deuteron bombardment, *Proton bombardment, *Conductivity, *Germanium, *Crystal structure, *Radiation effects, Surfaces, Rectifiers, Semiconductors, Single crystals, Electrical properties.

N-type germanium crystals, both dendrites and ordinary crystals, were irradiated with two mev deuterons and protons in order to find if any differences in the effects on conductivity of radiation exist between the two types of crystals. The electron reduction rate and the hole production rate was found to be greater by a factor of approximately 2 in the dendrite crystals. The results indicate the formation of acceptor levels associated with the surface. These levels are relatively more important in the more perfect surfaces of the dendrites. A demonstration, showing the possibility of making electronic devices by a simple radiation process, was also conducted. (Author)

AD-287 163 Div. 25
(TISTP/WH) OTS price $1.10

Polytechnic Inst. of Brooklyn, N. Y.
(No title).
Final rept., 1 Feb-31 Aug 62,
by A. L. Harvey. 31 Aug 62, 4p.
(Contract Nonr-83933)
Unclassified report

DESCRIPTORS: *Gravity, *Relativity theory, Theory.

Research concerned the review of past attempts to construct a Lorentz - covariant theory of gravitation and to renew these attempts with the assistance of ideas developed in recent years. (Author)

AD-287 198 Div. 25
(TISTP/JW) OTS price $4.60

General Electric Co., Schenectady, N. Y.
UNDERWATER SOUND PROPAGATION BY RING-STIFFENED CYLINDICAL SHELLS.
Final rept. part 1,
by R. B. Tatge. Oct 62, 22p. incl. illus. 6 refs. (Rept. no. 62GL146)
(Contract NObs-78547)
Unclassified report

DESCRIPTORS: *Acoustics, *Underwater sound, *Cylindrical bodies, Elasticity, Surfaces, Vibration, Stiffened cylinders, Ship hulls, Equations, Motion.

A mathematical representation of ring-stiffened cylindrical shells and their water environment is developed in order to permit cclculation of vibrational response to a given input and the resulting acoustic field. (Author)

AD-287 199 Div. 25
(TISTM/TCG) OTS price $1.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
DIVISION 8. SOLID STATE.
Quarterly progress rept., 1 July-30 Sep 62.
15 Oct 62, 3p.
(Contract AF 19(628)500)
(AFESD TDR 62-142) Unclassified report

DESCRIPTORS: *Solid state physics, *Semiconductors, *Materials, *Solids, Gallium compounds, Arsenides, Plasma oscillations, Absorption, Infrared radiation, Electron transitions, Praseodynium compounds, Oxides, Magnetic moments, Magnetic susceptibility, Spectrographic analysis, Lead compounds, Tin compounds, Germanium compounds, Tellurides, Indium compounds, Antimonides, Mercury compounds, Selenides, Transport properties, Calcium compounds, Fluorides, Bibliography, Magnetic properties.

Contents:
Solid state device design
Chemistry
Materials research
Band structure of solids
Microwave and magnetic properties of solids

AD-287 202 Div. 25, 20
(TISTP/JW) OTS price $2.60

Naval Radiological Defense Lab., San Francisco, Calif.
ENERGY RESPONSE OF LANDSVERK IONIZATION CHAMBERS TO MONOENERGETIC GAMMA RAYS,
by R. L. Lynn and V. L. DaGragnano. 7 May 62, 21p. incl. illus. table, 6 refs. (Rept. no. NRDL-TR-580)
Unclassified report

DESCRIPTORS: *Isotopes, *Ionization chambers, *Calibration, Energy, Gamma rays, Intensity, Measurement, Scintillation counters.

An energy response calibration of Landsverk L-65, L-81, and L-83 pocket chambers was carried out using monoenergetic gamma-emitting radioisotopes. Since the intensity of the sources was low, the pocket chambers were used as ratemeters and the ionization current was read on a vibrating-reed electrometer. The dose rate of each isotope (Co60, Cs137, Hg203, and Ce141) was calibrated with a scintillation spectrometer. The angular response of the chambers for the energies of 1.25 Mev, 662 Mev, 279 kev, and 145 kev, respectively, was measured in one quadrant. The effect of wall thickness on the energy response was also investigated. (Author)

AD-287 204 Div. 25
(TISTP/JW) OTS price $1.60

Stanford Research Inst., Menlo Park, Calif.
THEORETICAL STUDY OF GROUND MOTION IN UNIFORMLY VARYING AND LAYERED ELASTIC MEDIA.
Final rept., Phase 1 on Propagation of Waves in Nonhomogeneous Elastic Media,
by F. C. Gair and R. C. Alverson. Sep 62, 16p. incl. illus. table, 1 ref.
(Contract AF 29(601)4283, Proj. 1080)
(AFSWC TDR 62-33) Unclassified report

DESCRIPTORS: *Wave analysis, *Statistical processes, Couplings, Ground effect, Motion, Density, Velocity, Shear stresses.

Uncoupled wave equations are developed for a

nonhomogeneous half-space for two cases, where Poisson's ratio is constant, and where Poisson's ratio increases with depth in a nonarbitrary but realistic manner. The resulting wave equations are numerically solvable by the method of characteristics since they are identical to those for a homogeneous medium. (Author)

AD-287 233 Div. 25, 2
(TISTP/FR) OTS price $5.60

New Mexico U. Engineering Experiment Station, Albuquerque.
AN ANALOG COMPUTER FOR CALCULATING ATMOSPHERIC DENSITY AND REFRACTIVE INDEX,
by Wallis R. Cramond and Donald C. Thorn.
July 61, 49p. incl. illus. tables, 5 refs.
(Technical rept. no. EE-58)
(Contract DA 29-040-ORD-1238)
Unclassified report

DESCRIPTORS: *Analog computers, Atmosphere, Density, Refractive index, Equations, Temperature, Barometric pressure, Humidity, Potentiometers.

The design and operation of a simple analog computer to solve for refractivity and density in the atmosphere are given. The equation for density is developed and appropriate scale changes are included to cover most all meteorological situations. Special attention is given to the design of a non-linear potentiometer. Accuracy and tolerance requirements are discussed. Sufficient information including circuit diagrams is presented from which similar units could be built. (Author)

AD-287 282 Div. 25
(TISTP/JW) OTS price $3.60

Technical Research Group, Syosset, N. Y.
THE SCATTERING OF ACOUSTICAL WAVES BY SLENDER BODIES,
by J. Lurye and S. Cutler. 18 May 62, 25p. incl. illus. tables (Rept. no. TRG-166-FR)
(Contract Nonr-361000)
Unclassified report

DESCRIPTORS: *Acoustics, *Wave characteristics, *Cylindrical bodies, Scattering, Diffraction, Fluid flow, Green's function, Bodies of revolution, Ship hulls.

An approximate solution is given to the problem of diffraction of sound waves by slender bodies. The solution is obtained as the first term in an expansion in terms of a ''slenderness parameter'' and is represented as due to a distribution of sources along the axis of an arbitrary body. As a test of the solution it is applied to shapes for which the exact solution is known. Comparison shows that it is fairly accurate in these cases. (Author)

AD-287 295 Div. 25
(TISTP/JW) OTS price $1.10

Florida U., Engineering and Industrial Experiment Station, Gainesville.
APPLICATION OF SHALLOW SHELL THEORY TO EQUILIBRIUM AND BUCKLING PHENOMENA.
Final rept.,
by William A. Nash. Oct 62, 6p.
(Grant no. DA ORD-31-124-61-G19, Proj. DA-599-01-004 and ARO(D) Proj. 2028-E)
(AROD 2028:14) Unclassified report

DESCRIPTORS: *Buckling, *Equilibrators, *Elastic shells, Dynamics, Statics, Loading, Stresses, Equations.

The statics and dynamics of thin elastic shallow shells were investigtated. A difficulty in the finite-deflection analysis of such problems is that the governing equations are coupled. In earlier work approximate equations that were uncoupled were developed. These basic equations were applied to several boundary-value problems, and the analytical results were found in agreement with experimental data obtained. Another phase pertained to an analytical and experimental investigation of the stabilizing effect of a soft elastic core contained within a thin shell. It was demonstrated that even a very flexible core greatly increased the resistance of the shell to buckling. Still another phase of the study pertained to analysis of stresses in (a) conical shells of variable wall thickness and (b) shells of revolution of negative Gaussian curvature subject to an arbitrary thermal field. Studies were made to investigate the behavior of thin cylindrical shells subject to rapid loadings such that buckling occurs in a time interval of the order of magnitude of milliseconds. For an axially compressed cylinder, e.g., it was found that even moderately rapid loading increases the post-buckling resistance by approximately 50% over the static value. (Author)

AD-287 406 Div. 25, 2
(TISTM/EJH) OTS price $19.75

Ohio State U. Research Foundation, Columbus.
INFRARED ABSORPTION BY CARBON DIOXIDE, WATER VAPOR, AND MINOR ATMOSPHERIC CONSTITUENTS,
by Darrell E. Burch, David Gryvnak and others.
July 62, 316p. incl. illus. tables.
(Contract AF 19(604)2633)
(AFCRL 62-698) Unclassified report

DESCRIPTORS: *Infrared radiation, *Absorption, *Atmosphere, Gases, Nitrogen compounds, Carbon compounds, Oxides, Carbon dioxide, Monoxides, Methanes, Water vapor, Infrared spectrophotometers, Infrared spectroscopy, Theory, Mathematical analysis, Tables, Temperature, Pressure.

Results of studies concerned with the absorption of infrared radiation by various atmospheric gases are presented. Three previously published contractor reports on (1) absorption by nitrous oxide, carbon monoxide, and methane; (2) absorption by carbon dioxide; and (3) absorption by water vapor and nitrous oxide are placed under one cover. (Author)

AD-287 447 Div. 25
(TISTE/CAM) OTS price $1.10

Illinois U., Urbana.
THEORETICAL RESEARCH ON CONDUCTION OF ELECTRICITY IN SOLIDS.
Final technical and summary rept., 1 July 52-31 Aug 62,
by J. Bardeen and D. Pines. 1 Oct 62, 10p.
(Contract DA 11-022-ORD-1001, Proj. TB2-0001)
(AROD rept. no. 431.50)
Unclassified report

DESCRIPTORS: *Electricity, *Solid state physics, *Electrical conductance, Metallic crystals, Electrons, Paramagnetic resonance, Plasma oscillations, Superconductivity, Surface properties, Metals, Theory, Greens functions, Bibliography, Conductivity.

The collective description of electron interactions in metals was developed. The successful solution of polaron problem was obtained in the intermediate coupling range. A calculation of mobility of a polaron appropriate to intermediate coupling was accomplished. Various developments were made in phenomenological theories of superconductivity. An improved calculation

was made of the interaction between electrons resulting from the electron-phonon interaction. Various calculations were made on semiconductors. Quantum theoretic methods for calculation of transport properties of metals were developed and applied to the anomalous skin effect in normal and superconducting metals and to cyclotron resonance in metals. Developments were made in the theory of elementary excitations, spin diffusion, and transport properties of He4. (Author)

AD-287 457 Div. 25, 8
(TISTM/EJH) OTS price $5.60

Lowell Technological Inst. Research Foundation, Mass.
EFFECTS OF EXTERNAL FORCES ON VIBRATING CRYSTAL PLATES.
Quarterly rept. no. 5, 1 May-31 July 62,
by Charles R. Mingins, Robert W. Perry and Luther C. Barcus. 31 July 62, 47p. incl. illus. tables.
(Contract DA 36-039-sc-87198, Proj. 3G26-05-001)
Unclassified report

DESCRIPTORS: *Quartz crystals, *Crystal oscillators, Stresses, Deformation, Vibration, Test methods, Frequency, Perturbation theory, Mathematical analysis, Elasticity, Crystals, Piezoelectric crystals.

Effects of flexural stresses on the vibration of quartz piezoids were studied. Two methods of mounting were used: (a) a cantilever, and (b) a dual support arrangement. The effect of the cantilever clamping at various azimuthal angles was studied, and a sinusoidal shaped curve seemed to result. Deflection and curvature values for a given load were plotted and compared with those expected from the application of fiber theory. The fiber treatment is evidently not a sufficiently good approximation for this case. A method of getting at the effects of atomic displacements is implied. Perturbation methods were employed in an analysis of the effects of flexural stress on vibrations, with a promising degree of success. (Author)

AD-287 466 Div. 25, 30, 26
(TISTM/EJH) OTS price $2.60

Motorola, Inc., Phoenix, Ariz.
EPITAXIAL CONTROL SYSTEM,
by Don M. Jackson, Jr. 14 June 62, 16p. incl. illus. tables, 3 refs. (Scientific rept. no. 2)
(Contract AF 19(604)8351, Proj. 4608)
(AFCRL 62-741) Unclassified report

DESCRIPTORS: *Mass spectrometers, *Mass spectroscopy, *Single crystals, *Vapor plating, *Semiconducting films, Semiconductors, Silicon, Germanium, Growth, Manufacturing methods, Control systems, Impurities.

A highly sensitive mass spectrometer was selected for use in a vapor stream analysis system for an epitaxial growth reactor. The instrument will be used to monitor gas phase compositions. Preliminary calculations indicate that it will be feasible to monitor gas phase impurities which will yield epitaxial film resistivities of from .001 to 100 ohm-cm, n and p type impurities. Silicon compounds will be subject to continuous analysis. Some anticipated problems are the loss of sensitivity due to corrosive nature of gases under investigation, interference from background cases, and unusually low impurity concentrations in the vapor sample. (Author)

AD-287 469 Div. 25, 30
(TISTP/JW) OTS price $1.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
RADIO STATION RECOGNITION: COMPUTER PROGRAM AND TEST RESULTS,
by Beulah Rudner and William A. Bellmer.
12 Jan 62, 13p. incl. illus. tables (Research rept. no. PIBMRI-979-61; Scientific rept. no. 2)
(Contract AF 19(604)6154, Proj. 4691)
(AFCRL 62-564) Unclassified report

DESCRIPTORS: *Radio signals, *Computer logic, Signals, Programming, Test methods, Data transmission systems, Sources.

A sequency of programs for determining the source of radio signals is described. Pattern recognition techniques are applied, the patterns being signal strength recordings lasting about a minute. The first program computes various properties from the patterns; the second computes statistics from patterns of known origin; the third makes a maximum likelihood determination of the source of unknown patterns on the basis of an assumed Gaussian distribution. The results of several tests are reported. (Author)

AD-287 470 Div. 25, 9
(TISTP/JW) OTS price $3.60

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
PARALLEL IMPEDANCE VOLTAGE EQUALIZATION,
by Dan Varon. Sep 62, 30p. incl. illus. 3 refs.
(Rept. no. PIBMRI-1036-62)
(Contract AF 30(602)2213)
(RADC TDR 62-418) Unclassified report

DESCRIPTORS: *Voltage, *Impedance, Integral equations, Electric currents, Equilibrators, Polynomials.

A current source is loaded by a parallel RC network. The voltage across the load terminals is equalized by a lumped, lossless, one-port impedance shunted across the load. The general shapes of physically realizable gain functions are found. An integral restriction is derived, and the necessary and sufficient condition for the realizability of the gain functions are formulated. A general analytic expression for an arbitrary realizable gain function is derived and the synthesis procedure is shown for realizing the equalizer's impedance from the given gain function. (Author)

AD-287 471 Div. 25
(TISTM/EJH) OTS price $4.60

Brown U., Providence, R. I.
A RELATIVE DETERMINATION OF THE VISCOSITY OF SEVERAL GASES BY THE OSCILLATING DISK METHOD,
by J. Kestin and J. H. Whitelaw. Sep 62, 46p. incl. illus. tables, 21 refs. (Technical rept. no. BRN-2-P)
(In cooperation with James Forrestal Research Center, Princeton U., N. J., Contract Nonr 185825, Proj. NR098-038)
Unclassified report

DESCRIPTORS: *Argon, *Carbon dioxide, *Helium, *Neon, *Nitrogen, *Viscosity, Gases, Viscosimeters, High pressure research, High temperature research, Density, Disks, Oscillation, Mathematical analysis.

New measurements are reported of the viscosity of argon, carbon dioxide, helium, neon and nitrogen in the range of temperatures 25 - 270 C and in the range of pressures 1 - 150 atm. The measurements are relative to nitrogen at 22 C; they were performed by the use of an oscillating-

disk viscometer. Empirical correlations and correlations based on the use of a Lennard-Jones 6 - 12 and a Buckingham exp - 6 potential are presented. Except for helium, either potential gives a reasonable fit; in the case of helium the fit provided by the exp - 6 potential is preferable. (Author)

AD-287 481 Div. 25
(TISTP/TL) OTS price $8.10

Institute of Mathematical Sciences, New York U., N. Y.
GEOMETRICAL HYDROMAGNETICS,
by J. Bazer and J. Hurley. Aug 62, 80p. incl. illus. 29 refs. (Research rept. no. EM-176)
(Contract AF 19(604)3495, Proj. 5631)
(AFCRL 62-704) Unclassified report

DESCRIPTORS: *Magnetohydrodynamics, *Compressible flow, *Shock waves, *Magnetic fields, Partial differential equations, Propagation, Reflection, Refraction, Velocity, Equations, Snell's law.

The propagation of small disturbances in an infinitely conducting, perfect, compressible medium is studied from the standpoint of geometrical hydromagnetics. The medium need not be homogeneous. A wave-like time-harmonic disturbance is assumed given on an arbitrary reference surface. Then the various phase fronts (slow, Alfven and fast) are obtained as solutions first order partial differential equations. These eikonal-like equations are solved by means of rays. The hydromagnetic analogue of Huygen's phase front construction is described. Next, the variation of the disturbance strengths along the rays is determined in terms of the disturbance strengths on the reference surface, to complete the geometrical solution. The complete geometric solution for the propagation of Alfven disturbances in a dipole field is described with the aid of explicit formulas. Fast wave propagation in various types of inhomogeneous magnetic fields is also briefly discussed. Finally, the problem of reflection and refraction of slow, Alfven and fast disturbances at (possibly curved) surfaces of discontinuity is treated. The hydromagnetic analogues of Snell's laws are derived and their relation to Huygen's wavelet construction is elucidated. (Author)

AD-287 497 Div. 25, 8
(TISTE/CAM) OTS price $2.60

New Mexico U. Engineering Experiment Station, Albuquerque.
A PROTOTYPE LIGHT-WEIGHT REMOTE MICROWAVE REFRACTOMETER,
by Donald C. Thorn, Wallis R. Cramond and others. July 62, 22p. incl. illus. 21 refs. (Technical rept. no. EE-63)
(Contract DA 29-040-ORD-1238)
Unclassified report

DESCRIPTORS: *Refractometers, *Atmospheric sounding, Guided missile noses, Sounding rockets, Design, Microwave frequency, Cavity resonators, Refractive index, Instrumentation, Microwaves, Radio transmitters, Radio receivers, Radiosondes.

A special microwave refractometer which conforms to severe weight and space limitations is described, which is designed on a different principle from previous types of refractometers. It is divided into two separate units: a self-contained transmitter and a ground unit. The transmitting unit is designed to be packaged into the nosecone of an ARCAS missile to be carried aloft to sound the upper atmosphere to an altitude of approximately 200,000 ft. A maximum weight requirement of 7.5 lb. is imposed upon the transmitter. Because of space and weight requirements, the transmitting unit is to have a minimum number of components. All the information required to determine the relative index of refraction is obtained and coded by the transmitter. The ground unit receives the information transmitted by the airborne unit and must be able to amplify, decipher, and record the desired information. (Author)

AD-287 507 Div. 25
(TISTP/TL) OTS price $8.60

Stanford Research Inst., Menlo Park, Calif.
RESEARCH STUDY OF MICROWAVE BREAKDOWN OF AIR AT HIGH ALTITUDES.
Final rept.,
by William E. Scharfman, William C. Taylor, and Tetsu Morita. Aug 62, 89p. incl. illus. tables, 24 refs.
(Contract AF 19(604)7367)
(AFCRL 62-732) Unclassified report

DESCRIPTORS: *Microwaves, *Air, *High altitude, Atmosphere, Wave transmission, Gas discharge, Voltage, Gas ionization, Electrons, Density, Plasma physics, Electric fields, Ionization, High frequency.

Almost all of the published work dealing with voltage breakdown at microwave frequencies was concerned with breakdown in the presence of surfaces to which particles can diffuse. Recent laboratory experiments performed using focused microwaves to effect a discharge in the absence of proximate surfaces are described. The experiments were concerned with: (1) the determination of the power level at which the breakdown occurs; (2) the ability of the atmosphere to act as a medium for the transmission of power after breakdown has occurred; and (3) the properties of the plasma formed when breakdown occurs. Data is presented on minimum power required for breakdown under these conditions, demonstrating agreement with theoretical analysis based on models of varying complexity. An experiment is described which shows that power per unit of input power, received beyond the discharge plasma by a test antenna, decreases as power is increased after breakdown. Measurements with positive ion probes are described, showing that this type of discharge induces lower maximum ionization densities than those in a section of waveguide where the RF is constrained to propagate directly through the plasma. Finally, a microwave technique is described for determining the ionization rate of various gases; the results given for such measurements are shown to compare favorably with other techniques for this determination. (Author)

AD-287 510 Div. 25
(TISTP/JW) OTS price $6.60

Technical Research Group, Syosset, N. Y.
ANALYSIS OF NONLINEAR MOTION OF HYDROFOIL CRAFT IN WAVES,
by Paul Kaplan and Stanley Ulc. 11 June 62, 51p. incl. illus. table, 11 refs. (Rept. no. TRG-148-FR)
(Contract Nonr-332700)
Unclassified report

DESCRIPTORS: *Ocean waves, *Hydrofoil boats, Nonlinear systems, Wave characteristics, Oscillation, Lift, Linear systems, Fluid flow, Equations, Motion.

AD-287 534 Div. 25
(TISTP/WH) OTS price $5.60

Pitman-Dunn Labs. Group, Frankford Arsenal, Philadelphia, Pa.
A TRIFILAR PENDULUM FOR THE DETERMINATION MOMENTS

OF INERTIA,
by A. L. Korr and Paul Hyer. Aug 62, 51p. incl. illus. table (Rept. no. R-1653)
Unclassified report

DESCRIPTORS: *Physical properties, *Test methods, *Harmonic analysis, *Mechanics, *Moments, Instrumentation, Tables, Determination.

A unique trifilar pendulum was constructed which proved to be an accurate tool for the determination of moments of inertia of non-homogeneous objects. The pendulum was used with a calibration curve. The curve was generated by plotting a quantity calculated from the weight and the period squared of a number of homogeneous solids of revolution of increasing size as ordinates, against the calculated moments of inertia of these solids as abscissae. The moment of inertia of an unknown was obtained by weighing the object, establishing its period on the pendulum, locating a quantity calculated from its period squared and its weight as an ordinate on the calibration curve, and finding the moment of inertia as the corresponding abscissa. (Author)

AD-287 567 Div. 25
(TISTM/TCG) OTS price $1.10

New York U., N. Y.
A STUDY OF THE FAR INFRARED PROPERTIES OF CRYSTALS.
Scientific rept. no. 19, 1 Mar-31 May 62,
by J. H. Rohrbaugh. 31 May 62, 5p.
(Contract AF 19(604)2673)
(AFCRL 62-712) Unclassified report

DESCRIPTORS: *Crystals, *Infrared spectroscopy, Refractive index, Optics, Physical properties, Potassium compounds, Bromides, Infrared spectrophotometers, Infrared radiation.

AD-287 598 Div. 25
(TISTP/JW) OTS price $1.60

General Telephone and Electronics Labs., Inc., Bayside, N. Y.
STUDY OF ADSORPTION OF GASES ON SOLIDS IN THE HIGH VACUUM RANGE.
Scientific rept. no. 2,
by C. M. Bliven and T. G. Polanyi. 31 Aug 62, 8p. incl. illus. (Rept. no. TR 62-255.2)
(Contract AF 19(628)331, Proj. 4619)
(AFCRL 62-773) Unclassified report

DESCRIPTORS: *Adsorption, *Vacuum systems, Pressure, Gases, Solids, Measurement, Adsorption indicators.

An ultra-high-vacuum system for gas adsorption measurements at low pressures was set in operation and data are reported on the processing of the system and on the composition of the final gas ambient under several operating conditions. When the system is open to the pumps total pressures of less than 10 to the -11th power Torr were measured. When the system is isolated from the pumps by means of high-vacuum valves, a linear increase of He partial pressure was measured over a 7 day period up to a pressure of 10 to the minus 6th power Torr. For a short time argon appeared to a pressure of 5 x 10 to the -10th power Torr and later disappeared. (Author)

AD-287 599 Div. 25
(TISTM/ODN) OTS price $1.60

Acoustics and Seismics Lab., U. of Michigan, Ann Arbor.
LOW-FREQUENCY ANECHOIC TANK FOR UNDERWATER-SOUND STUDIES.
by C. L. Wakamo. Nov 62, 11p. incl. illus. 3 refs. (Rept. no. 2784-8-T)
(Contract Nonr-122424)
Unclassified report

DESCRIPTORS: *Anechoic chambers, *Underwater sound, *Water tanks, Acoustics, Sound, Concrete, Standing wave ratios, Low frequency, Coatings.

The building (in conjunction with laboratory studies of underwater acoustics) of an anechoic tank is described. The walls were made highly absorptive by using a combination of high-density concrete and SAPER T absorber material. Refined absorption was effected by the elimination of all free air-water interfaces and the exclusion of air from the space between the coating and wall structure. The tank has performed effectively at frequencies as low as 200 cps. The particular combination of SAPER T and wall structure was evaluated by measurements of standing wave ratio. Problems of design and maintenance were easily solved, and isolation was provided from structure-borne noise. An incidental feature is the tank's ready convertibility for reverberation studies. (Author)

AD-287 606 Div. 25
(TISTP/LMH) OTS price $1.60

Boeing Scientific Research Labs., Seattle, Wash.
SOME NEW TECHNIQUES FOR SCATTERED LIGHT PHOTOELASTICITY,
by Y. F. Cheng. Sep 62, 17p. incl. illus. 6 refs
(Rept. no. D1-82-0202)
Unclassified report

Also available from the author.

DESCRIPTORS: *Light, *Wave transmission, Scattering, Propagation, Photoelasticity, Refraction, Polarization.

Some new techniques in determining the directions of the secondary principal stresses and their difference in scattered light photoelasticity are described. Experiments were made for cases where the secondary principal axes remain constant and good agreements were found. It was noted that if the light vector parallels with one secondary principal axis, the intensity for observation along this axis will be a minimum. We also noted that the light vector rotates with the secondary principal plane along which it entered, and produces a component in the transverse direction of negligible amplitude. If a plane polarized beam coincides with one secondary principal plane at the point of entrance, it will continue to coincide with this plane as it rotates. Based on these facts, the secondary principal axes at an interior point are determined by setting the polarizer with its axis parallel to one secondary principal axis at the point of entrance. Rotate the direction of observation about the axis of propagation until the light intensity at the point reaches a minimum. The direction of observation will then coincide with one secondary principal axis at the point. (Author)

AD-287 613 Div. 25
(TISTM/ODN) OTS price $1.10

Army Electronics Research and Development Lab., Fort Monmouth, N. J.
FINE-GRAINED FERRITES. II. Ni1-xZnxFe2O4,
by W. W. Malinofsky, R. W. Babbitt, and G. C. Sands. Mar 62, 10p. incl. illus. tables.
(ASRDL Technical rept. no. 2256)
Unclassified report

DESCRIPTORS: *Ferrites, *Ferromagnetic materials, Crystals, Magnetic properties, Microwaves, Temperature, Stability, Nickel compounds, Zinc compounds, Iron compounds, Oxides, High frequency, Radiofrequency.

A series of fine-grained single-phase ferrites was prepared according to the formula Ni1-xZnxFe2O4, where x took the values 0.10, 0.33, 0.50, and 0.67. A process combining the so-called flame-spraying and hot-pressing techniques was used to obtain grain sizes of approximately 0.1 micron in the densified bodies. Measurements were made to 3.8 Gc on a ferrite annealed through the critical size for multidomains, confirming the previously reported theory that magnetic poles on the domain walls are the source of the microwave peak at about 2 Gc. In addition, the temperature dependence of initial permeability was studied. The temperature coefficient was found to increase with grain size. Microwave properties were also studied. Because zero-field (Hdc = 0) measurements showed that fine grains (i.e., below the critical size for multidomains) eliminated the so-called microwave loss peak in the rf dispersion, a decrease in the low-field loss follows. Microwave measurements of the main resonance loss susceptibility vs. rf power were made at X band using a cavity technique. Although normal critical fields were generally found, one sample with x = 0.67 and delta H = 655 oersteds showed an anomalous rise at high powers, significantly expanding its power-handling capability. (Author)

AD-287 638 Div. 25
(TISTP/FR) OTS price $3.60

Israel Inst. of Tech., Haifa.
BUCKLING OF ORTHOTROPIC CONICAL SHELLS UNDER EXTERNAL PRESSURE,
by Josef Singer and Rena Fersht-Scher. Sep 62, 35p. incl illus. tables, 16 refs. (Technical note no. 1; TAE rept. no. 22)
(Grant AF-EOAR-62-61)
Unclassified report

DESCRIPTORS: *Structural shells, Conical bodies, Deformation, Presure..

Donnell stability equations for thin, circular, orthotropic conical shells are presented and solved for external pressure loading. The solution is likewise applied to stiffened conical shells by consideration of equivalent orthotropic shells. Typical cases are computed and compared with corresponding isotropic shells. Correlation with equivalent cylindrical shells then yields a simple approximate stability analysis for orthotropic or ring-stiffened conical shells under hydrostatic pressure. (Author)

AD-287 670 Div. 25, 9
(TISTP/JW) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
EXPERIMENTAL INVESTIGATION OF HEAT EXCHANGE OF A PLATE WITH LONGITUDINAL AIR FLOW DIRECTED AROUND IT,
by A. N. Chaplina. 10 Oct 62, 8p. incl. illus. table, refs. (Trans. no. FTD-TT-62-1413 from Inzhenerno-Fizicheskiy Zhurnal 5:7, pp. 34-38, 1962)
Unclassified report

DESCRIPTORS: *Heat exchangers, *Fluid flow, Boundary layer, Translations, Turbulent flow, Intensity, Convection.

Described is a method and results of experimentally investigated local heat exchange of a plate around which a longitudinal forced turbulent air flow is directed. The results of this investigation differ by 8% from the data calculated by general formulas. (Author)

AD-287 674 Div. 25
(TISTM/TCG) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ACTIVATION MECHANISM OF CdS SINGLE CRYSTALS IN THE PRESENCE OF LOCAL X-IRRADIATION,
by A. Ye. Kiv. 20 Sep 62, 9p. incl. illus. 9 refs. (Trans. no. FTD-TT-62-885 from Nekotoryye Voprosy Prikladnoy Fiziki. Tashkent, Izdatel'stvo Akademii Nauk Uzbekskoy SSR, pp. 86-93, 1961)
Unclassified report

DESCRIPTORS: *Cadmium compounds, *Sulfides, *Single crystals, *X rays, Photoconductivity, Photoelectrons, Catalysts, Lattices, Diffusion, Semiconductors, Heat treatment, Theory, USSR, Radiation effects.

Research was conducted on CdS single crystal, irradiated locally by X-rays to determine the activation mechanism. The formation and nature of the defects of X-irradiation of the crystal and the role of defects arising from X-irradiation in the activation of the crystal were studied. (Author)

AD-287 675 Div. 25
(TISTP/JW) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
TEMPERATURE FIELD OF A LIMITED BODY, HAVING THE FORM OF A PARALIELEPIPED WITH CONTINUOUSLY ACTIVE SOURCE OF HEAT,
by I. G. Alyamovskiy. 8 Oct 62, 5p. (Trans. no. FTD-TT-62-1391 from Tezisy Dokladov I Soobshcheniy Na Soveshchanii Po Teplo I Massoobmenu, pp. 1-7, 5-9 June 61)
Unclassified report

DESCRIPTORS: *Heat exchangers, *Conductivity, Temperature, Symposia, Boundary layer, Convection, Translations, Equations.

AD-287 684 Div. 25, 15
(TISTA/VGW) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
INVESTIGATION OF THE PATH OF RAYS IN A SPECULAR OPTICAL SYSTEM,
by B. L. Poshekhonov. 8 Oct 62, 10p. incl. illus. 2 refs. (Trans. no. FTD-TT-62-1218 from Izvestiya Vysshikh Uchebnykh Zavedeniy, Priborostroyeniye 4:4, pp. 78-84, 1961)
Unclassified report

DESCRIPTORS: *Optical systems, Mirrors, Rotating structures, Reflection, Optics, Translations, USSR, Mathematical analysis.

AD-287 689 Div. 25, 17
(TISTM/TCG) OTS price $6.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
PROBLEMS IN THE PHYSICS OF METALS AND METALLOGRAPHY (SELECTED ARTICLES).
17 Sep 62, 64p. incl. illus. tables, 19 refs. (Trans. no. FTD-TT-62-625 from Voprosy Fiziki Metallov i Metallovedeniya, Sbornik Nauchnykh Rabot, Izd-vo AN UKSSR, Kiev, No. 12, pp. 21-36, 46-60, 124-134, 1961)
Unclassified report

DESCRIPTORS: *Metals, *Alloys, *Solid state physics, Crystals, Crystal structure, Lattices, Deformation, Heat treatment, Hardening, Martensite, X-ray diffraction analysis, Energy, Electrons, Valence, Additives, Chemical elements, Steel, USSR.

Contents:
The influence of hardening and tampering on the fine crystal structure of martensite
Study of the energy of electrons in metals utilizing the phenomenon of annihilation of positrons by electrons
The influence of alloying elements on changes in mosaic structure and martensite crystal-lattice distortions

AD-287 693 Div. 25, 20
(TISTM/TCG) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
GENERALIZATION OF EXPERIMENTAL DATA ON THE VISCOSITY AND HEAT CONDUCTIVITY OF LIQUID METALS,
by A. G. Usmanov. 6 Sep 62, 9p. incl. illus. tables, 4 refs. (Trans. no. FTD-TT-62-933 from Konvektivnyy i Luchistyy Teploobmen, Moscow, Izdatel'stvo Adademii Nauk SSSR, pp. 97-106, 1960)
Unclassified report

DESCRIPTORS: *Liquid metals, *Viscosity, *Thermal conductivity, *Heat transfer, Physical properties, Thermodynamics, Tables, Reactor coolants.

A generalization of experimental data on the viscosity and heat conductivity of liquid metals is made. Data are included for Na, K, Sn, Pb, Bi, and Hg. (Author)

AD-287 694 Div. 25
(TISTP/JW) OTS price $1.10

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ISOTHERMAL ACCELERATION OF A ONE-DIMENSIONAL PLASMA FLOW IN EXTERNAL TRANSVERSE HOMOGENEOUS MAGNETIC AND ELECTRICAL FIELDS,
by V. M. Sarychev. 20 Sep 62, 6p. 3 refs. (Trans. no. FTD-TT-62-1186 from Zhurnal Prikladnoy Mekhaniki i Tekhnicheskoy Fiziki No. 1, pp. 12-14, 1962)
Unclassified report

DESCRIPTORS: *Plasma physics, *Fluid flow, *Conductivity, Magnetic fields, Electric fields, Ionization, Acceleration, Translations, Heat exchangers, Density, Jets.

Assuming the applicability of one-dimensional equations of continuous media, isothermal acceleration of plasma in external transverse homogeneous magnetic and electrical fields in 2 particular cases is considered: (a) with constant current density along the channel and (b) in a channel with a constant angle of expansion. Isothermal acceleration of plasma in a thermal jet is also considered. An investigation is made for two forms of the dependence of the conductivity of plasma on its density. (Author)

AD-287 699 Div. 25, 9
(TISTP/JW) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE PROPAGATION OF ELECTROMAGNETIC WAVES IN PLASMA ACROSS AN EXTERNAL MAGNETIC FIELD,
by Yu. N. Dnestrovskiy and D. P. Kostomarov. 13 Sep 62, 14p. 3 refs. (Trans. no. FTD-TT-62-1187 from Zhurnal vychislitel'noy Matematiki i Matematichiskoy Fiziki 2:1, pp. 97-106)
Unclassified report

DESCRIPTORS: *Electromagnetic waves, *Plasma physics, Magnetic fields, Propagation, Ionization, Kinetic theory, Translations, Partial differential equations.

AD-287 704 Div. 25, 30, 8, 12
(TISTE/CRJ) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
SUPERCONDUCTIVITY WILL KNOCK INTO THE DOORS OF TECHNOLOGY,
by M. Volgin and M. Karev. 21 Sep 62, 12p. incl. illus. (Trans. no. FTD-TT-62-1214 from Znaniye-Sila No. 5, pp. 23-25, 1961)
Unclassified report

DESCRIPTORS: *Superconductivity, *Superconductors, USSR, Translations, Electricity, Transmission, Electrical conductance, Computers, Memory devices, Helium, Amplifiers, Bolometers, Compasses, Space environmental conditions.

Superconductivity is discussed with respect to transmission of electric power without losses, memory in liquid helium, superconductor metering device, noiseless amplifier, cosmic compass, liquidation of friction, and energy from the cosmos.

AD-287 717 Div. 25
(TISTP/WH) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
A STUDY OF THE PROCESS OF CONVECTIVE HEAT TRANSFER IN WINDING SLIT CHANNELS,
by L. M. Kovalenko. 30 Aug 62, 10p. incl. illus. 8 refs. (Trans. no. FTD-TT-62-1175 from Teploenergetika No. 2, pp. 77-79, 1962)
Unclassified report

DESCRIPTORS: *Heat transfer, *Convection, *Heat exchangers, USSR.

The results are given of a study of a model of a laminated heat exchanger composed of plates with herringbone corrugations. The problem of the intensification of convective heat transfer is one of the most important in the development of new heat-exchanger designs. (Author)

AD-287 753 Div. 25
(TISTP/WH) OTS price $6.60

Boeing Scientific Research Labs., Seattle, Wash.
HELICAL INSTABILITIES IN SOLID-STATE PLASMA,
by Oivin Holter. Sep 62, 60p. incl. illus. table, 14 refs. (Document no. D1-82-0198)
(In cooperation with Bergen U., Norway)
Unclassified report

Also available from the author.

DESCRIPTORS: *Helixes, *Solid state physics, *Plasma physics, *Magnetic fields, *Semiconductors, *Perturbation theory, Special functions, Transformations (Mathematics).

The background of thermal carriers is included in a theory for helical instabilities in electron-hole plasmas. The theory applies to any injection level in intrinsic, n-type, and p-type semiconductors and to insulators. Given the

temperature dependence of the mobilities, one can determine the plasma temperature from the electric field at the onset of instability. The n the frequency of the instability can be calculated. A comparison with Ancker-Johnson's experiment in p-InSb shows that the calculated frequencies are within 20% of the experimental values for high magnetic fields, and are a factor circa 2 smaller for low fields. The calculated plasma temperature reaches the optical phonon energy at an electric field of approximately 55 V/cm, and remains close to this temperature for higher fields. The results of numerical calculations for a number of different materials are given. (Author)

AD-287 760 Div. 25
(TISTW/PCR) OTS price $4.60

Watervliet Arsenal, N. Y.
STRESSES IN PRESSURIZED SPHEROIDAL SHELLS - PART II,
by M. A. Sadowsky and Y. Weitsman. Aug 62, 41p. incl. illus. tables (Technical rept. no. WVT-RR-6218)
(Proj. 50101033)
Unclassified report

DESCRIPTORS: *Spheres, Mathematical analysis, Equations, Elasticity, Thickness, Fourier analysis, Series, Mechanics, Stresses, Pressure.

This investigation, based on the three dimensional theory of elasticity, deals with a confocal prolate spheroidal shell of variable thickness, subjected to constant internal gas pressure. A theoretical solution is obtained by means of an infinite Fourier Legendre series. A numerical example, using the method of sectionalization and incorporating the first ten terms of the infinite series, has been worked out and resulted in a satisfactory degree of approximation. (Author)

AD-287 761 Div. 25
(TISTP/TL) OTS price $4.60

Laboratoire Mediterraneen de Recherches Thermodynamiques (France).
EXPERIMENTAL RESEARCHES ON CHARGE OR MOMENTUM EXCHANGE BETWEEN IONS AND MOLECULES IN ORDER TO OBTAIN HIGH SPEED MOLECULAR BEAM.
Final rept.,
by F. Marcel Devienne, B. C. Crave and others.
Aug 62, 30p. illus. 6 refs.
(Contract AF 61(052)561)
Unclassified report

DESCRIPTORS: *Molecular beams, *Ions, *Molecules, *Ion accelerators, Velocity, Detectors, Aluminum compounds, Measurement, Experimental data.

An analysis is presented on the main methods used to determine physical data which characterise the high speed molecular beam, and in particular, the speed of molecules and the efficiency of the exchange processes. (Author)

AD-287 818 Div. 25, 8
(TISTE/CRJ) OTS price $3.60

General Telephone and Electronics Labs., Inc., Bayside, N. Y.
HOT CARRIER PHENOMENA IN SEMICONDUCTORS AT MICROWAVE FREQUENCIES.
Quarterly rept. no. 1, 15 May-15 Aug 62,
by Esther M. Conwell, Vernon J. Fowler and Joseph Zucker. 15 Aug 62, 29p. incl. illus.
(Rept. no. TR 62-303.1)
(Contract DA 36-039-sc-89174, Proj. 3A99-21-001; Continuation of Contract DA 36-039-sc-87298)
Unclassified report

DESCRIPTORS: *Semiconductors, *Microwave amplifiers, Microwave frequency, Conductivity, Electrons, Phonons, Dielectric properties, Indium compounds, Antimonides, Magnetic fields, Microwaves, Propagation, Mathematical analysis, Germanium, Waveguides, Cavity resonators, Temperature.

The possibility of achieving amplification of microwaves by means of hot electrons in InSb with an applied magnetic field was investigated with the use of the simple model of the band structure. Preliminary results indicate the possibility of obtaining amplification of circularly polarized plane microwaves using a bulk semiconductor such as InSb with two carriers and steady axial magnetic and electric fields. Probe measurements were made to detect phonons emitted by hot electrons in adjacent field-free regions in n-type Ge. High levels of spurious voltage pickup masked any phonon-drag effect that may have been present. Small-signal measurements of conductivity and dielectric constant at 69.25 kmc as functions of dc bias field were made on one InSb sample. Very strong field dependence was observed, and it appears that this material may be applicable to variable-reactance devices at submillimeter wavelengths. Large-signal experiments were also performed in which the InSb sample was made to function as a bolometer-type peak power detector at 69.25 kmc. A hot-carrier mixer was constructed which will be used to measure the extent to which the heating of the carriers follows the field at 24 kmc. (Author)

AD-287 821 Div. 25, 32, 26
(TISTM/ODN) OTS price $1.10

General Dynamics/Fort Worth, Tex.
MATERIALS - SOLID STATE REACTIONS AT HIGH TEMPERATURE - DEVELOPMENT OF X-RAY DIFFRACTION TECHNIQUES FOR STUDY OF,
by H. J. Weltman. 26 Oct 62, 12p. incl. illus. 18 refs. (Rept. no. FGT-1840)
(Contract AF 33(657)7248)
Unclassified report

DESCRIPTORS: *Solids, *Bibliography, Goniometers, Foils, Aluminum, Beryllium, Copper electrodes, Tantalum, Vacuum furnaces, Laboratory equipment, High temperature research, X-ray diffraction cameras.

A literature survey was conducted on high temperature x-ray diffraction equipment and techniques. The designs of various cameras and diffractometers were studied and compared. After considering the advantages and disadvantages of each type, a high temperature diffractometer furnace attachment to a wide angle goniometer was decided upon. A furnace was designed which could be used to obtain x-ray diffraction patterns at temperatures up to 1600 C and at pressures of 10 to the -6th power mm of Hg or at controlled atmospheres. Essentials of this design are (1) water-cooled Al housing; (2) Al or Be foil windows for passage of x-rays; (3) water-cooled Cu electrodes; (4) Ta heating elements; and (5) Ta radiation shields. A stainless steel shaft is made to extend through the goniometer so that the furnace attachment can be interchanged with the standard room temperature sample holder with a minimum of effort. Alignment procedures and optimum sample preparations for this instrument were devised. (Author)

AD-287 827 Div. 25
(TISTP/WH) OTS price $1.60

Israel Inst. of Tech., Haifa.
YIELD AND ANGULAR DISTRIBUTION OF CERENKOV RADIA-

TION FROM EXTENSIVE AIR SHOWERS,
by Henry Kasha and Yona Oren. 1 July 62, 9p. incl. illus. 1 ref. (Technical note no. 5)
(Contract AF 61(052)196)
(AFCRL 62-1046) Unclassified report

DESCRIPTORS: *Cerenkov radiation, *Cosmic rays, *Cosmic ray telescopes.

The relative yield of Cerenkov radiation from extensive air showers and its angular distribution were measured as a function of the shower size in the range 40,000 to 2,000,000 particles. It was found that the larger showers are not as efficient in producing Cerenkov light signals as the smaller ones. The effect can be understood in light of the results on the angular distribution of Cerenkov radiation near the shower axis which was found to be more peaked fowards in larger showers. This result also leads to the conclusion that the angular distribution of electrons with energy > 21 mev near the axis of extensive air showers is dependent on the shower size. (Author)

AD-287 833 Div. 25
(TISTP/WH) OTS price $1.60

Northeastern U., Boston, Mass.
CONVENTIONAL AND PLASMA THERMOCOUPLES,
by Jack Davis and Giovanni Lanza. 5 June 62, 17p. incl. illus. 9 refs. (Scientific rept. no. 1)
(Contracts AF 19(604)7358, AF 19(604)8462 and AF 49(638)555, Proj. 6694)
(AFCRL 62-630) Unclassified report

DESCRIPTORS: *Thermocouples, *Thermoelectricity, *Irreversible processes, *Differential equations, *Plasma physics, *Electrons, *Thermal conductivity, *Electrical conductance, Theory.

Existing theory on conventional thermocouples is summarized and revised. Utilizing the concepts and ideas of irreversible thermodynamics we are able to obtain the Seebeck, Peltier and Thomson coefficients by making use of the relations between the phenomenological coefficients. Since we are mainly interested in developing a general theory for a plasma thermocouple employing these methods we consider a simple case as an example of how one uses the techniques of irreversible thermodynamics. To this end we assume the collision term in the Boltzmann equation can be replaced by a relaxation type of phenomena. We then consider an electron gas in a solid conductor using Fermi Dirac statistics and a plasma using Maxwell Boltzmann statistics. With these simplified assumptions we obtain the usual expressions for the electrical and thermal conductivities. (Author)

AD-287 846 Div. 25, 30
(TISTP/WH) OTS price $2.00

Stanford Research Inst., Menlo Park, Calif.
VIBRATION AND SHOCK EXCITER USING ELECTRIC-FIELD MODULATION OF HYDRAULIC POWER.
Final rept., June 61-May 62 on Refinement of a Hydraulic Shock-Shaker,
by John J. Eige and Edward C. Fraser. Aug 62, 69p. incl. illus. tables, 6 refs.
(Contract AF 33(616)8468, Proj. 1309)
(ASD TDR 62-536) Unclassified report

DESCRIPTORS: *Impact shock, *Vibration, *Test facilities, *Hydraulic systems, *Hydraulic fluids, *Dielectric properties, *Acceleration.

The design is discussed of a novel form of shock and vibration exciter. This shock-shaker is driven by hydraulic power, controlled by valves with no moving parts. These modulators consist of concentric cylinders, insulated from each other, and separated by narrow gaps through which a special dielectric fluid is pumped. Voltages applied between the cylinders control the fluid flow by their direct action upon the fluid, in what was called the Winslow effect. New information about the behavior of this electric fluid was developed in order that a mathematical model of a shock-shaker system could be formulated. The resulting equations allow scaling the system to fit specified output goals, given various fluid parameters. The electrical circuits developed during this project provide for acceleration feedback, to reduce distortion and to regulate acceleration level, and for position feedback to keep the output piston centered. Brief tests showed that this shock-shaker was capable of vibrating a 10-pound mass at 17 g peak. Maximum response was at about 150 cps, falling off at higher or lower frequencies, with usable response between about 20 cps and 3000 cps. (Author)

AD-287 862 Div. 25
(TISTW/PCR) OTS price $2.60

Perkin-Elmer Corp., Norwalk, Conn.
RUBY IMPROVEMENT FOR LASERS - TASK II.
Quarterly rept. no. 1, 1 May-31 July 62,
by J. G. Atwood and G. W. Dueker. 31 Aug 62, 21p. incl. illus. (Rept. no. PE TR-7201)
(Contract DA 36-039-sc-89091, Proj. 3A-99-21-001-05)
Unclassified report

DESCRIPTORS: *Ruby, *Lasers, Production, Specifications, Spectrophotometers, Interferometers, Polariscopes, Scattering, Test methods, Photographs.

Performance of ruby optical masers is dependent on the optical quality of the material, as well as on the geometry of the resonant structure employed. The purpose of this investigation is to determine what optical test methods are most effective in evaluating ruby quality for laser applications. Description of equipment and techniques to be used is given for measuring such properties as optical density, large and small angle scattering, axis orientation and lineage, and optical parallelism. (Author)

AD-287 877 Div. 25, 2
(TISTW/DLW) OTS price $.50

Aeronautical Research Labs., Office of Aerospace Research, Wright-Patterson Air Force Base, Ohio.
A PORTABLE LOW-LEVEL LIGHTMETER. I: LOW-LEVEL LIGHTMETER FOR THE NEAR INFRARED,
by Radames K. H. Gebel. Aug 62, 4p. incl. illus. (Suppl. 1 to rept. no. ARL 62-415)
(Proj. 7072)
Unclassified report

DESCRIPTORS: *Photometers, *Night sky, *Infrared image tubes, *Image converter tubes, Photomultipliers, Infrared radiation, Sensitivity, Measurement, Test equipment, Design, Infrared equipment, Brightness.

Results of former attempts to establish a value for visible radiation in the region between 7000 and 11,000 Angstroms in the near infrared of the night sky were unreliable due to lack of precision instruments. In this modification for the low-level lightmeter, an infrared image-converter tube for converting the infrared into visible radiation is employed. Further, better stabilization in the transformer and change of voltage in the photomultiplier are made to achieve a higher sensitivity of the meter.

Improvement in registering the brightness of the night sky in the near infrared (6300 to 11,000 Angstroms was noted. (Author)

AD-287 880 Div. 25, 2
(TISTW/DLW) OTS price $.50

Aeronautical Research Lab., Office of Aerospace Research, Wright-Patterson Air Force Base, Ohio.
A PORTABLE LOW-LEVEL LIGHTMETER. II. MODIFIED LOW-LEVEL LIGHTMETER FOR THE NEAR INFRARED,
by Radames K. H. Gebel. Aug 62, 3p. incl. illus.
(Suppl. 2 to rept. no. ARL 62-415)
(Proj. 7072)
Unclassified report

DESCRIPTORS: *Photometers, *Night sky, *Infrared image tubes, *Image converter tubes, *Photomultipliers, Infrared radiation, Sensitivity, Effectiveness, Design, Infrared equipment, Brightness.

Experiments to achieve a higher sensitivity in the low-level lightmeter for operation with a narrow bandwidth monochromator in near infrared observations was advanced by an experimental photomultiplier tube. This tube produces a sensitivity approximately 5 times greater than was possible with previous lightmeters. Recommendations are made for further increasing effectiveness in use of the low-level lightmeter by incorporating a new 16-stage near infrared photomultiplier tube with a very large aperture and short-focal-length lens. (Author)

AD-287 885 Div. 25
(TISTP/JW) OTS price $23.50

California U., Los Angeles.
ON THE USE OF PIEZOELECTRIC-MAGNETOSTRICTIVE COUPLING IN DIGITAL DEVICES,
by Arthur A. Borsei. Aug 62, 450p. incl. illus. 101 refs. (Rept. no. 62-37)
(Contract Nonr-23352)
Unclassified report

DESCRIPTORS: *Thin films, *Piezoelectric materials, Magnetic fields, Piezoelectric crystals, Magnetostrictive elements, Stresses, Cylindrical bodies, Switching circuits, Digital computers, Analog computers, Ferromagnetism.

AD-287 888 Div. 25
(TISTP/JW) OTS price $3.60

Electronic Defense Labs., Mountain View, Calif.
SCATTERING OF WAVES BY MULTI-COMPONENT TWO-PHASE SYSTEMS,
by Victor Twersky. 29 June 62, 26p. 12 refs.
(Engineering rept. no. EDL-E73)
(Contract DA 36-039-sc-87499)
Unclassified report

DESCRIPTORS: *Wave characteristics, *Scattering, Compressors, Propagation, Distribution, Intensity, Gases, Crystals, Green's function.

The scattering formalism of previous papers is extended to more general distributions. A ''two-phase'' system whose population is divided between a ''gas-like phase'' and a ''crystal-like phase'' is considered, and various scattering functions are analyzed. Generalized results concerning coherent and incoherent scattering are presented. Also considered are corresponding ''asymmetry functions'' which relate ''scattering statistics'' with ''signal statistics''. The asymmetry function plus the incoherent intensity provides the standard deviations and the correlation coefficient for representing the phase quadrature components of the instantaneous field by a bivariate normal distribution. (Author)

AD-287 896 Div. 25, 16
(TISTB/LMH) OTS price $4.60

Isomet Corp., Palisades Park, N. J.
DEVELOPMENT OF RAPID CLOSURE ELECTRO-OPTICAL CRYSTAL SHUTTER.
Final technical rept.,
by Warren Ruderman. 10 Sep 62, 26p. incl. illus. refs. (Rept. no. 5013-FR-62)
(Contract Nonr-312200)
Unclassified report

DESCRIPTORS: *Photoelectric shutters, *Flash burns, *Crystals, Nuclear explosions, Eye, Retina, Burns, Blindness, Goggles, Brightness, Optical systems, Optical equipment, Refractive properties.

Shutters using the electro-optic principle for the protection of personnel from flash blindness were investigated. Although a closure time of less than 5.0 microseconds was achieved, the shutter is limited by the following: closed density of less than 2 and field of view of only a few degrees. The electro-optic effect using presently available crystals does not, therefore, appear promising for a large field of view goggle. (Author)

AD-287 897 Div. 25, 9
(TISTP/JW) OTS price $9.60

Laboratory of Astrophysics and Physical Meteorology, Johns Hopkins U., Baltimore, Md.
A SLIT FUNCTION CORRECTION AND AN APPLICATION TO THE STUDY OF THE ABSORPTION LINES IN THE H2O PURE ROTATION SPECTRUM.
Progress rept.,
by Hajime Sakai. 15 Oct 62, 115p. incl. illus. tables, 37 refs.
(Contract Nonr-24858)
Unclassified report

DESCRIPTORS: *Absorption, *Spectrographic analysis, Water, Nitrogen compounds, Carbon dioxide, Helium, Groups (Mathematics), Errors, Reliability, Optics.

The slit function correction of the spectrometer was found to be related to the classical concept of optical resolving power. The conventional slit function correction was evaluated, and its ability to yield proper line parameters determined. The slit function for the spectrometer was compared with the theoretically established formula. After application of this slit function correction, the shape of water absorption lines in the 1/600 cm region was found to approximate the Lorentzian line shape reasonably well in the range where the measurements were not obscured by the noise level. The strengths of 14 water lines in the 1/500 to 1/600 cm region were determined under the assumption of Lorentzian line shape, and centrifugal distortion was indicated as responsible for the difference in observed and calculated rigid rotator line strengths. (Author)

26. PRODUCTION AND MANAGEMENT

AD-286 911 Div. 26
(TISTM/EJH) OTS price $2.60

Rotron Mfg. Co., Woodstock, N. Y.
THE DEVELOPMENT OF GAS LUBRICATED BEARINGS FOR USE IN BLOWER MOTORS.
Interim development rept., 7 June-7 Sep 62.
7 Sep 62, 20p. incl. illus. 28 refs.
(Contract NObsr-87522)
Unclassified report

DESCRIPTORS: *Gas bearings, *Journal bearings, *Thrust bearings, *Handbooks, Instruction manuals, Electric motors, Blowers, Fans, Design, Mathematical analysis, Materials, Test equipment, Bearings.

Work is well along on formulating a gas bearing design manual, to be used for the design of gas-lubricated, self acting journal and thrust bearings for blower motors in the range from 10 to 500 cfm. A test rig was developed to verify the theoretical design curves with experimental data. Design of a gas lubricated blower motor in the 20 cfm range is proceeding using a 29 frame size motor (1-13/16 in O.D.). The bearing to be utilized in this design will be a 3/8 in. bore by 1-1/4 in. long self acting unit type bearing. Bearing materials for use in the motor are being reviewed with respect to their ability to withstand solid contact during starts and stops. (Author)

AD-286 980 Div. 26, 17
(TISTM/EJH) OTS price $14.50

Chance Vought Corp., Dallas, Tex.
SHEET METAL FORMING TECHNOLOGY.
Interim technical engineering rept. no. 3, 1 June-30 Sep 62,
by W. W. Wood, R. E. Goforth and others.
30 Sep 62, 213p. incl. illus. tables, 2 refs.
(Contract AF 33(657)7314, Proj. 7-871)
(ASD TR 7-871, vol. 3) Unclassified report

DESCRIPTORS: *Sheets, *Metals, *Manufacturing methods, Velocity, Impact shock, High pressure research, High temperature research, Explosive forming, Dies, Metal forming presses, Pipes, Rubber, Tensile properties, Mechanical properties, Beryllium, Titanium alloys, Aluminum alloys, Steel, Nickel alloys, Stainless steel, Cobalt alloys, Heat resistant alloys, Molybdenum alloys, Niobium alloys.

Results of combined high velocity - high temperature tensile testing and combined high velocity - high pressure - high temperature impact rubber forming are reported. In addition, results were obtained from experimental work on the high explosive - open system, low explosive - closed system, and the electrohydraulic - open system. Tensile tests and free forming of bulged domes and tubes were carried out on specimens of various gages to velocities and temperatures of 900 f/sec and 2400 F respectively. Critical speeds were found for the longitudinal tensile tests and the bulged domes, beyond which negligible ductility exists. Improvements in ductility of over 100% were found for both the high velocity and the high temperature specimens over the static and ambient temperature specimens in some of the tests. Die formed parts were fabricated and found to agree with values obtained by free forming. High pressure static and impact rubber forming tests were concluded. The effect of rubber pressure was very pronounced in increasing formability to the critical pressures developed in the last report. (Author)

AD-287 004 Div. 26, 17
(TISTM/TCG) OTS price $1.00

Watertown Arsenal Labs., Mass.
EFFECT OF BILLET HISTORY ON HOT EXTRUDED PROPERTIES OF 1020, 4330 AND SI-MODIFIED 4340 STEEL.
Technical rept. on Basic Production Engineering Investigation on Metal Cutting and Related Process,
by Roger A. Gagne. Sep 62, 32p. incl. illus. tables (Rept. no. WAL TR 310.22/3)
Unclassified report

DESCRIPTORS: *Extrusion, *Steel, *Mechanical properties, Heat treatment, Tensile properties, Metallurgical analysis, Hardness, Stresses, Deformation, Elasticity, Casting, Forging, Manufacturing methods.

Three types of steels (1020, 4330 and Si-modified 4340 steel), each with four different billet histories, were not extruded. The effects of prior billet histories and of process variables, such as reduction ratio, were studied with the extruded material in both the as-extruded and the extruded-plus-heat-treated conditions. The studies included tensile tests, metallographic examination and the effect of location along the length of the extrusion. (Author)

AD-287 201 Div. 26, 17
(TISTM/TCG) OTS price $3.60

Naval Ordnance Test Station, China Lake, Calif.
ENGINEERING PROPERTIES OF EXPLOSIVELY WORK-HARDENED STEELS,
by George A. Hayes and John Pearson. Sep 62, 34p. incl. illus. tables, 4 refs. (Rept. no. NOTS TP 2994)
(NAVWEPS rept. no. 7953)
Unclassified report

DESCRIPTORS: *Explosive forming, *Hardening, *Steel, Heat treatment, Tensile properties, Fracture (Mechanics), Deformation, Elasticity, Hardness, Thickness, Metals, Surfaces, Explosives, Mechanical properties.

An experimental study is discussed in which permanent changes were produced in the engineering properties of 4 annealed steels (1015, 1030, 1050, and 4130) by means of contact explosive charges of different thicknesses. Quantitative data is presented for explosively induced changes in proportional limit, yield strength, ultimate strength, fracture strength, elongation, and toughness for the 4 steels as related to charge thickness and distance from the metal-explosive interfaces. (Author)

AD-287 278 Div. 26, 17
(TISTM/ODN) OTS price $1.00

Defense Metals Information Center, Columbus, Ohio.
SUMMARY OF THE SECOND AND THIRD TECHNICAL BRIEFINGS ON REFRACTORY METAL ALLOY STRUCTURAL FASTENERS,
by W. S. Hyler and R. M. Evans. 8 Oct 62, 27p. incl. illus. tables (DMIC memo. no. 158)
(Contract AF 33(616)7747, Proj. 2(8-8975)
Unclassified report

Technical Briefings held on April 12 and August 22, 1962 at Wright-Patterson Air Force Base, Ohio.

DESCRIPTORS: *Refractory materials, *Bolts, *Nuts (Mechanics), *Metals, Alloys, Production, Niobium alloys, Rivets, Molybdenum alloys, Coatings, Tensile properties, Tungsten alloys, Molybdenum, Metal coatings, Plating, Niobium, Titanium alloys, Zirconium alloys, Bibliography.

This memorandum is a compilation and discussion of the information presented at the Second and Third Technical Briefings on Refractory Metal Alloy Structural Fasteners, held at Wright-Patterson Air Force Base, Ohio, April 12 and August 22, 1962, respectively. This summary was prepared by the Defense Metals Information Center. A summary of the work done by Republic Aviation Corporation was made from the preliminary project reports presently available. One of the purposes of the discussions at the briefing on April 12, 1962, was to review current thinking on the thread form for threaded bolts and nuts.

Following the formal presentation, a discussion of the subject developed certain basic agreements regarding the nuts and bolts to be supplied to Republic Aviation Corporation on this program. The essential features of this thread form are discussed. (Author)

AD-287 291 Div. 26, 17
(TISTM/TCG) OTS price $1.60

Armour Research Foundation, Chicago, Ill.
PILOT EVALUATION OF VANADIUM ALLOYS.
Bimonthly rept. no. 3, 18 Jan-17 Mar 62,
by B. R. Rajala and F. C. Holtz. 13 Apr 62,
11p. incl. tables. (Rept. no. ARF 2231-3)
(Contract NOw 62-0101-c)
Unclassified report

DESCRIPTORS: *Vanadium alloys, *Niobium alloys, Production, Processing, Heat treatment, Mechanical properties, Tensile properties, Hardness, Microstructure, Hafnium alloys, Titanium alloys, Oxygen, Nitrogen.

Compositions based upon V-1wt-% Ti-60 wt-% Cb and V-1 wt-% Hf-60 wt-% Cb complexed with 0.05 to 0.1 wt-% O and/or N were evaluated for fabricability. The materials containing less than 0.06 wt-% deliberate interstitial additions could be rendered to sheet by warm (1000 F) working; compositions with greater amounts could not be fabricated even by hot working in the temperature range 1800 to 2400 F. Tensile evaluations conducted on V-5 wt-% Ti-20 wt-% Cb and V-5 wt-% Ti-20 wt-% Cb-0.05 wt-% O at 2000 F in He showed that the addition of 0.05 wt-% O resulted in approximately a 40% increase in strength. A large number of V-base alloys were also evaluated for tensile strength at 2400 F. The highest 2400 F ultimate tensile strength measured was 12,700 psi for the alloy V-1 wt-% Ti-60 wt-% Cb, a value comparable to that measured for several commercial and experimental Cb-base alloys. In addition, several compositions were equally as strong on a density-corrected basis. (Author)

AD-287 403 Div. 26, 17
(TISTM/EJH) OTS price $2.50

Alloyd Corp., Cambridge, Mass.
A STUDY OF ELECTRON-BEAM WELDING.
Quarterly rept. no. 2,
by S. S. White and R. Bakish. Feb 62, 103p. incl. illus. 10 refs.
(Contract DA 19-020-ORD-5484, Proj. 5B93-32-004)
(Technical rept. no. WAL 401-54/2-3)
Unclassified report

DESCRIPTORS: *Welding, *Welds, *Electron beams, *Titanium alloys, Heat treatment, Heating, Welded joints, Chromium alloys, Tin alloys, Molybdenum alloys, Mechanical properties, Aluminum alloys, Vanadium alloys, Stresses, Impact shock, Elasticity.

Techniques were developed for the utilization of the electron beam as a practical tool for post heating of weldments in material of any initial hardness or condition of heat treatment. Ultimate strengths of electron beam weldments in solutionized and rolled titanium alloy sheet were obtained in fusion and heat affected zones by this technique. Strengths of the 180,000 psi ultimate strength level were produced. Impact resistances remain high, and incremental strains may be increased. Aged titanium alloys show impact resistance and strain increases. Moduli of elasticity in base metal and fusion zones may be matched for titanium alloys in any condition of heat treatment or hardness prior to welding. (Author)

AD-287 437 Div. 26, 15
(TISTP/GRW) OTS price $1.60

George Washington U., Washington, D. C.
A MODEL FOR CHOOSING PROTECTION LEVELS FOR EQUIPMENT CLASSES WITHIN A SET OF SUBSYSTEMS,
by Jerome Bracken and Thomas C. Varley.
31 Oct 62, 9p. incl. illus. tables, 2 refs.
(Serial no. T-147)
(Contracts Nonr-76105 and Nonr-76106, Proj. nos. NR 047 001 and NR 347 008)
Unclassified report

DESCRIPTORS: *Probability, *Weapons, *Operations research, Groups (Mathematics), Games theory, Convex sets, Reliability.

Given a system of the structure assumed, or which was transformed into the structure assumed, a model is proposed which computes alternative sets of protection levels for equipment classes to satisfy specified subsystem protection levels. The calculation procedure is algorithmic or canonical once the system was represented in terms of the model. Procedures are suggested for further manipulating the alternative sets which are computed, to yield further alternatives. (Author)

AD-287 522 Div. 26, 15
(TISTP/WH) OTS price $1.10

Numerical Analysis Research, U. of Calif., Los Angeles.
NETWORKS OF QUEUES WITH CONTROLLED SERVICE RATES,
by James R. Jackson. 28 Aug 62, 8p. (Working paper no. 10; Research rept. no. 77)
(Contract Nonr-23373)
Unclassified report

DESCRIPTORS: *Operations research, *Probability, *Statistical distribution, *Numerical analysis.

Equilibrium state probabilities are obtained for a class of job-shop-like queueing models, in which the service rate at each center is an essentially arbitrary function of the number of customers present there. (Author)

AD-287 899 Div. 26, 9
(TISTM/EJH) OTS price $4.60

Mechanical Technology Inc., Latham, N. Y.
ANALYSIS OF PLAIN CYLINDRICAL JOURNAL BEARINGS IN TURBULENT REGIME,
by E. B. Arwas, B. Sternlicht, and R. J. Wernick.
Sep 62, 25p. illus. table, 13 refs. (Rept. no. MTI-62TR22)
(Contract Nonr-373100)
Unclassified report

DESCRIPTORS: *Journal bearings, *Lubrication, *Turbulence, *Turbulent flow, *Stresses, Lubricants, Water, Steam, Cylindrical bodies, Gas flow, Fluid flow, Loading, Design.

A theoretical analysis is presented of the steady state load carrying capacity, attitude angle and fluid film stiffness of plain cylindrical journal bearings operating in the turbulent regime. The calculated data on fluid film stiffnesses are included in this report so that they can be used to calculate system critical speeds. In the analysis presented here, side leakage is neglected, however. Existing published data on a 360 degree plain circular bearing was used to establish a correlation factor between laminar and turbulent leakage factors. (Author)

27. PROPULSION SYSTEMS

AD-286 979 Div. 27, 17, 26
(TISTM/EJH) OTS price $3.60

Lyon, Inc., Detroit, Mich.
DEVELOPMENT OF DEEP DRAWN - ONE PIECE HIGH PERFORMANCE ROCKET MOTOR CASE.
General rept. no. 20, 10 May-30 June 62, by C. J. Porembski. 30 June 62, 33p. incl. illus. tables.
(Contract DA 20-018-ORD-23004)
Unclassified report

DESCRIPTORS: *Rocket cases, *Steel, Processing, Drawing (Machine processing), Heat treatment, Austenite, Metallurgy, Mechanical properties, Microstructure, Hardness, Solid rocket propellants, Manufacturing methods.

Forty inch Diameter Pershing 2nd State Motor Case: The second group of cases were processed through the 5th draw. Metallurgical analysis of Rocket Case AT-5 after the fifth cold draw and anneal revealed: (1) Total range in hardness over the forward dome was 98.5 to 99.5 Rockwell B scale. A somewhat lower hardness throughout the reduced sidewall was due to processing differences; (2) Direction of the grain was radial in the dome and longitudinal in the sidewall. The sidewall possessed a finer and more uniform macrostructure than the forward dome; (3) Microstructure studies in the sidewall regions showed a relatively fine ferritic grain size and complete recrystallization during annealing. Ferritic grain size was somewhat coarser in the dome regions; and (4) Examination of case surfaces showed them to be free of complete decarburization on the sidewall regions; there was no evidence of decarburization on the dome surfaces.

AD-287 259 Div. 27, 10
(TISTA/SEB) OTS price $1.60

British Internal Combustion Engine Research Association.
COMBUSTION IN DIESEL ENGINES.
Rept. for 1 Aug 61-31 July 62, by P. F. Whelan. 21 Aug 62, 6p. illus. (Rept. no. ATR 1)
(Contract DA 91-591-EUC-1795)
Unclassified report

DESCRIPTORS: *Diesel engines, Fuel sprays, Hydrocarbons, Separation, Exhaust gases, Smokes, Pressure, Temperature, Combustion.

AD-287 287 Div. 27
(TISTA/SEB) OTS price $1.10

Aerospace Information Div., Washington, D. C.
LOCKING METHODS FOR TURBINE-BUCKET ATTACHMENTS.
5 Oct 62, 1p. incl. illus. (AID rept. no. 62-161, Referativnyy zhurnl: 42. Silovyye ustanovki, no. 14, 42.14.186 nd 42.14.187, July 1962)
Unclassified report

DESCRIPTORS: *Turbine blades, Attachment.

AD-287 410 Div. 27, 17
(TISTM/EJH) OTS price $3.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
FATIGUE TESTS AND CRACK DETECTION ON SOME TYPES OF AXIAL FLOW COMPRESSOR ROTOR BLADES,
by R. E. Thomas. Oct 62, 34p. incl. illus. tables, 2 refs. (Rept. no. AEDC TDR 62-168)
(Contract AF 40(600)1000)
Unclassified report

DESCRIPTORS: *Rotor blades, *Compressor blades, *Axial flow compressor blades, *Failure (Mechanics), Fracture (Mechanics), Test methods, Test equipment, Fatigue (Mechanics), Stresses, Vibration, Frequency, Mathematical analysis, Steel, Casting, Forging, Manufacturing methods.

Fatigue data were obtained from several types of compressor rotor blades that are in use in axial-flow compressors at the von Karman Gas Dynamics Facility. The data provided a general comparison of ''as manufactured'' endurance limits and were used as a verification control in evaluating a supplementary method of detecting failed blades during systematic maintenance inspections. By the presentation of stress versus cycles to failure curves, a comparison is made between AISI number-8630 cast steel blades as originally furnished with the compressors, AISI number-8630 cast steel shot-peened blades, and AISI number-403 forged, heat-treated and machined blades. A method is presented which may be used to supplement the magnetic particle method for detecting cracked rotor blades. (Author)

AD-287 661 Div. 27
(TISTA/SEB) OTS price $3.60

Ogden Air Materiel Area, Hill Air Force Base, Utah.
SAFE OPERATING TEMPERATURE LIMITS AND SHELF LIFE OF ROCKET MOTORS, 16-NS-1000, M15.
Airmunitions test rept., by Robert M. Cavett. Oct 62, 25p. incl. illus. tables (Rept. no. OOY TR 62-23)
Unclassified report

DESCRIPTORS: *Rocket motors, *Jatos, Storage, Reliability, Combustion, Low temperature research, High temperature research, Tests, Radiography, Life expectancy, Solid rocket propellant.

A test project was established to determine new temperature limits for 16-NS-1000, M15 Rocket Motors of ages up to 7 years which are to be used for training purposes. A total of 198 motors were inspected visually and radiographically, temperature conditioned to various temperatures and statically fired. Two motors out of 39 malfunctioned at -40 F. Consequently, the temperature level was then raised to -30 F. Seventy-one motors then fired satisfactorily. High temperature tests were conducted at 140 F and 88 motors performed satisfactorily. As a result of these tests, the temperature limits of the M15 Rocket Motor were changed to -20 F and 130 F. These new limits are applicable to motors for training purposes; they apply to motors not more than 7 years old. (Author)

AD-287 685 Div. 27, 12
(TISTA/SEB) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
PLASMA ENGINES ION AND PHOTON ROCKET ENGINES,
by V. Kh. Abiants. 11 Oct 62, 12p. incl. illus. 4 refs. (Trans. no. FTD-TT-61-464 from Reaktivnyye Dvigateli i Bol'shiye Skorosti, Series IV, pp. 26-34, 1960)
Unclassified report

DESCRIPTORS: *Electric propulsion, Plasma physics, Photons, Electrons, Electric arcs, Cooling, Design, Ion rockets, USSR, Translations, Rocket motors.

AD-287 765 Div. 27, 33
(TISTW/PCR) OTS price $1.60

Scripta Technica, Inc., Washington, D. C.
USSR. STATE STANDARD. AIR CLEANERS FOR TRACTOR ENGINES. TEST-STAND METHODS.
1962, 13p. incl. illus. tables (Trans. no. T-1663)
Unclassified report

DESCRIPTORS: *Air intake filters, Standards, Test methods, Tests, Instrumentation, Tractor engines, USSR.

The present standard applies to tractor-engine air cleaners and establishes a program and methods for typical testing of mass-produced air cleaners as well as new and improved designs on a test stand without engine. Final evaluation of a new air cleaner, designed for installation in a specific engine, is being conducted from test data under direct use with this engine in agricultural work. The Standard provides for periodic control tests of mass-produced air cleaners; and acceptance tests of new and improved designs of air cleaners. (Author)

AD-287 803 Div. 27, 30
(TISTA/SEB) OTS price $.50

Defense Metals Information Center, Columbus.
NONDESTRUCTIVE TESTING OF SOLID-PROPELLANT ROCKET MOTORS,
by R. L. Pasley and C. L. Seale. 24 Oct 62, 13p. incl. illus. (DMIC memo. no. 159)
(Contract AF 33(616)7747, Proj. 2(8-8975)
Unclassified report

DESCRIPTORS: *Rocket motors, *Non-destructive testing, *Rocket cases, Ultrasonics radiation, Dyes, X-ray spectroscopy, Infrared spectroscopy, Magnetic fields, Electromagnetic waves, Radiography, Fluoroscopes, Solid rocket propellants, Test methods.

Methods are given for nondestructively inspecting rocket motor cases, nozzles, and motor-case insulation. The motor cases may be fabricated from steel, titanium, or glass-reinforced plastics and made by welding or wrapping processes. In some designs, the nozzle consists of tungsten inserts fitted in graphite heat-sink backup rings with a molybdenum sleeve shrunk over the graphite ring. The inside insulation is generally a rubber-base substance adhered to the motor case. (Author)

28. PSYCHOLOGY AND HUMAN ENGINEERING

AD-287 086 Div. 28
(TISTB/CCH) OTS price $1.10

School of Aerospace Medicine, Brooks Air Force Base, Tex.
PERCEPTION OF POSTURAL VERTICALITY. EFFECTS OF FLYING EXPERIENCE UPON REDUCTION OF ERROR,
by Edwin W. Moore and Robert L. Cramer.
June 62, 4p. incl. illus. tables, 7 refs. (Rept. no. SAM TDR 62-72)
Unclassified report

DESCRIPTORS: *Aviation medicine, *Reaction (Psychology), *Space perception, *Flight, *Pilots, Positioning reactions, Errors, Aviation personnel.

Test pilots were compared with nonflyers in their ability to estimate a function of the postural vertical. To minimize kinesthetic cues, the subjects were asked to bisect an angle between 30 degrees left body tilt and the vertical with visual references eliminated. The analysis of the average error and slope for each day of 3 daily sessions showed no differences between the experimental groups. However, a significant reduction in error demonstrated habituation over the 3-day period with a uniform linear reduction within each day. Therefore, habituation was demonstrated for all subjects, but flying experience seems to have no relationship to a person's reduction of error in estimating a function of the postural vertical. (Author)

AD-287 090 Div. 28, 16
(TISTB/CCH) OTS price $1.60

School of Aerospace Medicine, Brooks Air Force Base, Tex.
PSYCHOMOTOR FUNCTIONING WHILE BREATHING VARYING PARTIAL PRESSURES OF OXYGEN-NITROGEN,
by Jared M. Dunn. June 62, 11p. incl. illus. tables, 36 refs. (Rept. no. 62-82)
Unclassified report

DESCRIPTORS: *Psychomotor tests, *Pressure breathing, Oxygen, Nitrogen.

To examine the proposition that gaseous nitrogen produces some degree of narcosis under normal or reduced pressures, 70 subjects were tested on a multidimensional pursuit task while breathing various oxygen-nitrogen mixtures. The partial pressure of nitrogen was reduced in two ways: (1) by increasing the oxygen percentage in the mixture while maintaining constant total pressure, or (2) by decreasing the total pressure while maintaining a constant partial pressure of oxygen. There were no significant changes in performance that could be regarded as correlated with the nitrogen variable. However, increments in the partial pressure of oxygen lessened significantly the rate and magnitude of performance decrements, as noted by previous investigators. (Author)

AD-287 104 Div. 28
(TISTB/AW) OTS price $8.10

Douglas Aircraft Co., Inc., El Segundo, Calif.
SIGNAL DETECTION IN NOISY FIELDS: A DISCUSSION OF HUMAN AUDITORY CAPABILITY,
by S. Lippert. July 62, 80p. incl. illus. tables, refs. (Rept. no. LB 30984)
(Contract Nonr-107600)
Unclassified report

DESCRIPTORS: *Psychoacoustics, *Auditory perception, *Auditory signals, *Detection, Noise, Auditory thresholds, Pitch discrimination, Attention, Speech, Intensity, Sound, Absorption, Sound transmission, Attenuation, Water, Sea water, Antisubmarine warfare, Echo ranging, Intelligibility, Age, Women, Hearing.

A selected review of psychoacoustics related to detection is presented, potential areas of improvement in detection capability are proposed, and test programs and procedures for evaluating the merit of the proposals in engineering applications are outlined. (Author)

AD-287 123 Div. 28
(TISTB/AW) OTS price $2.60

Utah U., Salt Lake City.
VARIABLES RELATED TO ACCURACY IN INTERPERSONAL

PERCEPTION.
Annual rept. no. 5,
by Victor B. Cline, James M. Richards, Jr., and Clifford Abe. 1 Oct 62, 20p. incl. tables, refs.
(Contract Nonr-128804)
Unclassified report

DESCRIPTORS: *Perception, *Social communication, *Psychometrics, Group dynamics, Reasoning, Attitudes, Motion pictures, Personality, Test methods, Effectiveness.

A study of the correlates of judging ability was completed, using as predictors a set of communications abilities tests (Taylor, et al 1958). The measures of judging ability involved 12 films selected from the larger pool of 33. A study of psychological chance on the judging instruments was completed. The basic procedure was to have a group of judges fill out the judging instruments knowing only the sex of the person to whom the instruments pertained. A computer program in the general case was developed for computation of all of Cronbach's (1955) component scores, and the Interpersonal Accuracy Correlation and Variance scores developed by Cline and Richards (1960). Data was obtained and preliminary analyses completed for pilot studies of component scores using the new computer program. Final writeup for publication of four individual studies reported in earlier technical reports was completed. These writeups have been accepted by journal editors and will appear in the near future. (Author)

AD-287 197 Div. 28
(TISTB/LMH) OTS price $2.60

Civil Aeromedical Research Inst., Oklahoma City, Okla.
THE VISUAL PERCEPTION OF SIZE AND DISTANCE,
by Walter C. Gogel. July 62, 19p. incl. illus. refs. (Rept. no. 62-15)
Unclassified report

DESCRIPTORS: *Visual perception, *Space perception, Eye, Retina, Optics, Optical images, Stimulation, Analysis of variance, Psychometrics.

The perception of absolute distance has been assumed to be important in the perception of the size of objects and the depth between them. A different hypothesis is proposed. It is asserted that perceived relative size and distance are the primary psychological phenomena, with perceived absolute distance derived from the perceptual summing of perceived relative depths. In agreement with this point-of-view, it is stressed that relative, rather than absolute retinal extents, are the determiners of visually perceived extents. A principle called the ''adjacency principle'' is identified as perceptually organizing the relative retinal stimuli. This principle states that the apparent size or position of any object in the field-of-view is determined by whatever size or distance cues occur between it and adjacent objects. (Author)

AD-287 529 Div. 28
(TISTB/SAT) OTS price $1.00

Hughes Aircraft Co., Culver City, Calif.
HUMAN ENGINEERING IN REMOTE HANDLING.
Final rept., Mar 61-Feb 62 on Human Performance in Advanced Systems,
by W. B. Knowles. Aug 62, 32p. incl. tables, 55 refs.
(Contract AF 33(616)8028, Proj. 7184)
(MRL TDR 62-58) Unclassified report

DESCRIPTORS: *Human engineering, *Remote control systems, Bibliography, Reactor fuels, Contamination, Recovery vehicles, Accidents, Handling.

An analysis of remote handling systems from the human engineering point of view is presented. Examples of actual and anticipated remote handling applications are described. Current approaches to and expected trends in the design of remote handling systems equipment are presented. Human capabilities and limitations which should be carefully considered by designers of remote handling systems are specified. Research efforts regarded as essential to effective human engineering in this area are identified and discussed. Pertinent references are included in the last section and bibliography.

AD-287 557 Div. 28
(TISTB/SAT) OTS price $3.60

Louisville U., Ky.
SOME FACTORS INFLUENCING THE AUDITORY DIFFERENCE LIMEN,
Technical rept. for Sep 62,
by Michel Loeb and John Binford. Sep 62, 1v. incl. illus. tables, 22 refs.
(Contract DA 49-193-md-2197)
Unclassified report

DESCRIPTORS: *Psychoacoustics, *Auditory thresholds, Detection, Noise, Intensity, Reaction time, Conditioned reflex, Auditory acuity, Attention.

Eighteen college students were asked to detect occasional increments in intensity of a continuous noise or occasional pulses in a periodic train of noise pulses. Subjects performed a vigilance type of task under two conditions: (1) SH (Steady Hiss), and (2) PT (Pulse Train). Three levels of intensity were used in every type of discrimination. It was found necessary that the increments in the PT condition be appreciably greater than increments in the SH condition in order to ensure relatively equal discrimination difficulty levels. Relative frequency of detection decreased and latency of response increased with time for the intermediate difficulty of discrimination levels for both PT and SH type tasks. Under the most difficult and under the easiest conditions no trends were apparent. These results suggest that many apparent conflicts in the literature may derive from experiments in which discrimination difficulty was not taken into account or in which levels were not adequately controlled. (Author)

AD-287 639 Div. 28
(TISTB/LMH) OTS price $1.60

Human Resources Research Office, George Washington U., Washington, D. C.
FLASH LOCALIZATION AND RETICLE DESIGN,
by Alfred J. Kraemer, David L. Easley and Meredith J. Hall. Oct 62, 11p. incl. illus. tables.
(Contract DA 44-188-ARO-2)
Unclassified report

DESCRIPTORS: *Visual perception, *Reticles, *Space perception, Fire control systems, Gun flash, Periscopes, Optical images, Simulation, Officer personnel, Military personnel, Test methods.

The accuracy with which simulated gun flashes could be localized in the field of view of a tank periscope with the aid of 4 different grid-type reticles was determined. Each of 4 groups of enlisted men localized 48 single flashes using 1 of the 4 reticles. For 3 of the reticles

data were also obtained from 3 groups of officers. Localizations were made by reading the azimuth and elevation of the perceived flash positions. No differences of consequence in performance were obtained between groups using different reticles. Enlisted men performed best with Reticle 4. Officers were found to localize more accurately than enlisted men, and it was suggested that the difference might be attributed to motivational factors. The results were compared with those of an earlier study in which gun-laying accuracy against flashes was measured. It was concluded that the use of a grid-type reticle would result in much greater gun-laying accuracy against flashes, if the tank fire control system were modified to enable the gunner to convert reticle readings accurately into lays of the gun. (Author)

AD-287 734 Div. 28
(TISTB/CCH) OTS price $2.60

Behavioral Sciences Lab., Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
A REVIEW OF THE EFFECTS OF WEIGHTLESSNESS ON SELECTED HUMAN MOTIONS AND SENSATIONS.
Report on Human Performance in Advanced Systems, by J. C. Simons and W. Kama. Apr 62, 22p. incl. illus. 18 refs.
(Proj. 7184)
Unclassified report

DESCRIPTORS: *Space flight, *Weightlessness, Motion, Motor reactions, Sensory perception, Circulatory system, Rotation, Gravity, Human engineering, Physiology.

The motions of the weightless free-floating worker are discussed in terms of an operator performing maintenance and supply functions between, upon, and within space vehicles. A postural coordinate system is used as a basic reference and current USAF studies concerned with rotating and translating the system are reviewed. Study techniques include physical analyses of the motions, inflight validation of the analyses and mathematical projections of probable orbital motions. Sensations to these motions and the ability to handle inertial objects is also discussed. The motion freedom of the unencumbered surface-free worker revealed many restraint requirements and such designs as lifelines, adhesive foot-gear and self-maneuvering units are introduced to limit and control his motions. These designs are being used to determine human factor criteria for space hardware and to suggest crew selection and training procedures. The effects of transient weightlessness on sensory, psychomotor, and motor functions have revealed minor effects; however, the perception of the postural vertical and the response of the circulatory system to the return of positive gravity are considered as pertinent problems. (Author)

AD-287 791 Div. 28, 30
(TISTP/FR) OTS price $4.60

Washington U., Seattle, Coll. of Engineering.
MAN-COMPUTER INTERFACE STUDY,
by D. L. Johnson and A. L. Kobler. June 62, 41p. refs.
(Contract AF 49(638)1070)
Unclassified report

DESCRIPTORS: *Digital computers, Human engineering, Applied psychology, Attitudes, Man, Personality, Learning.

An investigation and analysis were made of those factors fixing the interface existant in man-computer systems. Emphasis was placed upon three specific areas: (1) human attitudes, toward computer use and results, (2) machine learning processes, and (3) memory organization for meaning association and retrieval. All three of these areas were examined in respect to their potential in moving or fixing the man-machine interface for various types of problems. (Author)

AD-287 802 Div. 28
(TISTB/MD) OTS price $2.60

Arizona State U., Tempe.
A REINFORCER SYSTEM AND EXPERIMENTAL PROCEDURE FOR THE LABORATORY STUDY OF READING ACQUISITION.
Rept. on Psychological Processes in Language Communication,
by Arthur W. Staats, Karl A. Minke and others. Sep 62, 23p. incl. illus. 16 refs. (Technical rept. no. 22)
(Contract Nonr-279402)
Unclassified report

DESCRIPTORS: *Reading, *Learning, Behavior, Training devices, Conditioned reflex, Children, Language.

Progress is reported on construction of a laboratory procedure and apparatus for the experimental study of reading acquisition. A reading program was constructed which would be homogeneous in character so that the learning curves produced would not be variable from the influence of the reading materials. Apparatus was designed which enable the controlled presentation of the stimuli. Operant recording equipment was used to cumulatively record the child's reading response (actually a chain of responses involving visual discriminations, motor and vocal responses). A system of reinforcers was developed to maintain the child's participation and working behaviors for a long period of time. The reading materials proved to result in a relatively constant rate of response, allowing for the investigation of the effects of the reinforcement procedures. The reinforcing system appeared to solve the major problem involved in maintaining children's behavior over long periods so that complex behavior may be studied. (Author)

AD-287 838 Div. 28
(TISTB/SAT) OTS price $1.60

Ohio State U. Research Foundation, Columbus.
INDUCED COLLABORATION IN SOME NON-ZERO GAMES,
by Alvin Scodel. 1962, 13p. 6 refs.
(Contract AF 49(638)317)
Unclassified report

DESCRIPTORS: *Games theory, *Group dynamics, Test methods, Fear, Behavior.

Three kinds of 2-person non-zero-sum games were utilized in this study. Two of the games employed a matrix in which the competitive strategy did not dominate in a formal sense whereas the third involved a matrix of the dilemma variety in which the competitive strategy did dominate. In neither of the first 2 games was there any difference in the subjects' collaborative behavior for the 2 experimental conditions. Regardless of condition, however, subjects in these games manifested more collaboration than was true of games of identical matrices where pairs of subjects selected their own strategies. In the dilemma game, there was a pronounced difference between subjects under the 2 conditions - about half of the subjects exposed to the initially competitive stooge manifested collaboration in contrast to an almost complete absence of such behavior in those subjects who played with a collaborative stooge. The latter group played much like subjects playing the same game with other subjects. (Author)

AD-287 857 Div. 28, 30, 15, 16
(TISTB/LMH) OTS price $3.60

Chicago U., Ill.
STUDIES IN MATHEMATICAL BIOPSYCHOLOGY.
Report on Application of Information Theory to the Nervous System,
by H. D. Landahl and Harold White. 1 Apr 62, 29p. incl. illus. 12 refs.
(Contract AF 49(638)414, Proj. 9777C)
(AFOSR 2451) Unclassified report

DESCRIPTORS: *Psychology, *Nervous system, *Perception, *Information theory, *Color vision, Biophysics, Visual perception, Stimulation, Rhodopsin, Motion, Retina, Cells (Biology), Dark adaptation, Differential equations, Mathematics, Mathematical analysis.

A summary is given of work done on the following topics: Fusion frequency for stimuli of alternating duration. A mathematical model for color constancy. An approach to computers that perceive, learn and reason. In search of the fundamental units of perception: an outline. Formation of cell assemblies. Mathematical models for neurone interaction. Model for conditioning and the effect of spaced tracts in learning. A canonical form for nerve nets without circles. A report on a study of visual addaptation is given. Principal results are a second order differential equation for the concentration of rhodopsin, a model that explains how the sensitivity of the rod depends on the concentration, a model that explains the shape of the b-wave of the electroretinogram, and the fitting of some data on illumination thresholds on the basis of these models. (Author)

29. QUARTERMASTER EQUIPMENT AND SUPPLIES

AD-287 772 Div. 29
(TISTB/LMH) OTS price $15.00

MRD Div., General American Transportation Corp., Niles, Ill.
DEVELOPING INDUSTRIAL PRODUCTION FOR PACKAGING SPREADS AND SAUCES IN COLLAPSIBLE TUBES.
Final rept. on Industrial Preparedness Measures. 30 June62, 225p. incl. illus. tables.
(Contract DA 11-027-qm-(55)-84711)
Unclassified report

DESCRIPTORS: *Containers, *Packaging, *Military personnel, Armed forces, Metals, Plastics, Military equipment, Military requirements, Condiments, Manufacturing methods, Military rations, Food, Feeding.

The development of packaged Quick-Serve meals as field rations includes the provision of spreads and sauces in metal collapsible tubes or plastic squeeze tubes and necessitated exploration of the use of these tubes as food containers, the available commercial production facilities for producing and filling these tubes, and the equipment used in these facilities. This report presents the results of such a study in sections dealing with metal collapsible tubes, plastic squeeze tubes, caps and applicators, metal tube production, plastic tube production, cap production, and filling and closing. It is concluded that there is sufficient industrial capacity existing to meet military mobilization requirements for collapsible tubes and it is recommended that the Quick-Serve meal designs be completed and design confirmation orders for tubed spreads and sauces be placed. Tubes specifically designed for single use service are recommended and attention is called to a unique design of shoulderless tube manufactured from continuous lengths of tubing. (Author)

30. RESEARCH AND RESEARCH EQUIPMENT

AD-286 921 Div. 30
(TISTB/AW) OTS price $7.60

Air Force Inst. of Tech., Wright-Patterson Air Force Base, Ohio.
THRESHOLDING IN SELF-ORGANIZING MACHINES
Master's thesis,
by Robert Bradley. Aug 62, 60p. incl. illus. 8 refs. (Rept. no. GA/EE/62-3)
Unclassified report

DESCRIPTORS: *Computer logic, Special functions, Switching circuits, Ferrite cores, Nerves, Simulation, Computers.

The threshold unit is a simplified analog of the living neuron cell. Self-organizing machines were constructed, using the threshold unit as a Boolean function generator. These machines may be represented by a mathematical model. The model may be analyzed by vector and matrix methods. Analysis of a simple Perceptron by these methods indicates that the ability of the machine to identify noisy patterns may depend on the existence of one threshold unit which assigns all noisy patterns to the same class as the corresponding correct patterns. A method based on matrix representation of Karnaugh maps may be used as a design tool for analysis of threshold units and functions. (Author)

AD-286 974 Div. 30, 15
(TISTP/JW) OTS price $17.00

California U., Los Angeles.
PROPERTIES OF A VARIABLE STRUCTURE COMPUTER SYSTEM IN THE SOLUTION OF PARABOLIC PARTIAL DIFFERENTIAL EQUATIONS,
by Bertram Bussell. Sep 62, 258p. incl. illus. tables, refs. (Rept. no. 62-46)
(Contract Nonr-23352)
Unclassified report

DESCRIPTORS: *Partial differential equations, *Computer logic, Computers, Functions, Heat transfer, Conductors, Stability, Polynomials, Diffusion.

AD-286 976 Div. 30, 12
(TISTW/PCR) OTS price $10.50

Army Ordnance Arsenal, Philadelphia, Pa.
MULTISYSTEM TEST EQUIPMENT PROGRAM. FRANKFORD ARSENAL TASKS.
Quarterly technical rept. no. 2, 1 July-30 Sep 62,
by Allen Hoffman. Oct 62, 128p. incl. illus. table, refs. (Memo. rept. no. M63-11-2)
Unclassified report

DESCRIPTORS: *Test equipment, *Test sets, Test facilities, Test methods, Electronic equipment, Computers, Digital systems, Solid state physics, Memory devices, Measurement, Wiring diagrams, Data storage systems, Ground support equipment, Information theory, Magnetic tape, Data processing systems, Digital computers, Programming, Automatic.

This report presents a technical discussion of the progress made at Frankford Arsenal during the 2nd Quarter of the Multisystem Test Equipment

program (MTE) on the Frankford Arsenal tasks. Nine specific areas are discussed on an individual basis. Particular emphasis is given to Frankford Arsenal Technical supervision, Bulk memory study, Input-Output Buffer and the Compiler program. (Author)

AD-286 990 Div. 30
(TISTP/TL) OTS price $5.60

Sylvania Electric Products, Inc., Waltham, Mass.
RESEARCH PROGRAM TO EXTEND THE THEORY OF WEIGHT DISTRIBUTION AND RELATED PROBLEMS FOR CYCLIC ERROR-CORRECTING CODES.
Summary scientific rept., June 61-May 62. 30 June 60, 27p. refs.
(Contract AF 19(604)8516, Proj. 5632)
(AFCRL 62-524) Unclassified report

DESCRIPTORS: *Coding, *Mapping, *Functions, *Errors, Groups (Mathematics), Matrix algebra.

AD-287 039 Div. 30, 15
(TISTP/WH) OTS price $4.60

Cruft Lab., Harvard U., Cambridge, Mass.
COMPARISON OF DIFFERENT MODES OF REPRESENTATION OF MULTIVARIABLE SYSTEMS,
by Kumpati S. Narendra and Lyle E. McBride, Jr. 30 Mar 62, 41p. incl. illus. 8 refs. (Technical rept. no. 356)
(Contract Nonr-186616, Proj. NR 372-012)
Unclassified report

DESCRIPTORS: *Control systems, *Linear systems, *Partial differential equations, *Matrix algebra.

A multivariable system may be conveniently represented either by a matrix of transfer functions or by a set of first-order differential equations. The mode of representation depends on the nature of the problem and the constraints involved. The relative merits of several methods as well as their inherent limitations are treated. Concepts such as controllability, observability, structure and interaction which are peculiar to multivariable systems are examined to form a basis for the comparison. (Author)

AD-287 117 Div. 30
(TISTB/LMH) OTS price $10.10

Remington Rand Univac Div., Sperry Rand Corp., Philadelphia, Pa.
OPTIMIZATION AND STANDARDIZATION OF INFORMATION RETRIEVAL LANGUAGE AND SYSTEMS.
Final rept.,
by Earl G. Fossum, Gilbert Kaskey and others. July 62, 1v. incl. illus. tables, 9 refs.
(Contract AF 49(638)835)
(AFOSR-3216) Unclassified report

DESCRIPTORS: *Information retrieval, Data storage systems, Data processing systems, Computers, Vocabulary, Indexes, Standardization, Language.

A series of studies and analyses pertaining to that part of the overall information (document) retrieval function concerned with the storage and maintenance of the master ''index'' file and the processing of search requests against it is being conducted. This report presents the results of work over the past 2 yrs. (Author)

AD-287 182 Div. 30, 25
(TISTM/EJH) OTS price $2.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
VACUUM PUMPING BY CRYOSORPTION,
by S. M. Kindall and E. S. J. Wang. Oct 62, 21p. incl. illus. 15 refs. (Rept. no. AEDC TDR 62-183)
(Contract AF 40(600)1000)
Unclassified report

DESCRIPTORS: *Charcoal, *Activated carbon, *Vacuum pumps, *Cryogenics, *Adsorption, Pressure, Nitrogen, Gases, Vacuum apparatus, Surfaces, Mathematical analysis, Gas flow.

A method of measuring and analyzing the variation in the rate of adsorption by activated charcoal at 77 K for continuous inflow of nitrogen gas is presented. A set of adsorption parameters is developed for the analysis. Particular attention is given to the meaning of pumping speed for an adsorbent bed of charcoal pellets, and an equation is derived which describes the behavior of pressure in a chamber during continuous adsorption. (Author)

AD-287 183 Div. 30
(TISTA/SEB) OTS price $3.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
A CHECK CALIBRATION OF THE AEDC-PWT TRANSONIC MODEL TUNNEL,
by J. H. Nichols and F. M. Jackson. Oct 62, 25p. incl. illus. 2 refs. (Rept. no. AEDC TDR 62-206)
(Contract AF 40(600)1000)
Unclassified report

DESCRIPTORS: *Transonic wind tunnels, Calibration, Pressure, Instrumentation.

A brief investigation was conducted in the PWT Transonic Model Tunnel to check the validity of previous calibration results for two commonly used test section configurations. Static pressure measurements were made along the tunnel centerline and along the centerline of the top wall of the test section; simultaneous measurements of stilling chamber and plenum chamber pressures were obtained. The results of this investigation showed that the previous calibration results for a test section having four perforated walls was still correct, but previous results obtained with two perforated and two solid walls did not agree with those obtained in this investigation. This disagreement was felt to be caused by refinements in wall fabrication techniques and inaccuracies in the instrumentation used for the earlier investigation. (Author)

AD-287 232 Div. 30, 8
(TISTE/CRJ) OTS price $8.10

New Mexico U. Engineering Experiment Station, Albuquerque.
A PROTOTYPE TRANSMITTER FOR A MICROWAVE REFRACTOMETER,
by John C. Jordan and Donald C. Thorn. Nov 61, 80p. incl. illus. 21 refs. (Technical rept. no. EE-64)
(Contract DA 29-040-ORD-1238)
Unclassified report

DESCRIPTORS: *Refractometers, *Radio transmitters, *Atmospheric refraction, *Refractive index, Microwave equipment, Microwave frequency, Airborne, High altitude, Cavity resonators, Reflex klystrons, Microwave oscillators, Antennas, Reflectors, Mathematical analysis, Electronic circuits, Ogives, Superhigh frequency, X band, Frequency modulation, Measurement.

A study of the design, development and fabrica-

tion details of a transmitter for a microwave refractometer is presented. The basic components of the transmitter are as follows: self-contained power source, power converter, sawtooth voltage generator, klystron oscillator, resonant cavity, antenna and reflector. A dc-to-dc power converter is employed to furnish the required high voltages for the klystron oscillator and the sawtooth voltage generator. Generation of a carrier in the X-band is accomplished with the klystron oscillator and is frequency modulated by application of the sawtooth voltage to the repeller of the klystron. The resonant cavity produces the desired amplitude modulation of the frequency modulated signal. Information relating to the resonant frequency of the cavity is contained in the peak of the envelope of this special AM-FM signal. Suitable demodulation results in an indication of the index of refraction. (Author)

AD-287 270 Div. 30
(TISTB/CCH) OTS price $1.60

Aerospace Information Div., Washington, D. C.
CENTRAL NERVOUS SYSTEM MECHANISMS AND MODELS. BIBLIOGRAPHY.
22 Oct 62, 10p. (AID rept. no. 62-174)
Unclassified report

DESCRIPTORS: *Brain, *Bibliography, Cybernetics, Mathematical logic, Automation, Computers.

AD-287 275 Div. 30
(TISTA/GEC) OTS price $4.60

Air Force Office of Scientific Research, Washington, D. C.
ON THE NONLINEAR YAW MOTION OF A ROCKET SLED,
by Gerhard W. Braun and Harald A. Melkus.
July 62, 43p. incl. illus. table (Rept. no. AFOSR/DRA 62-13)
Unclassified report

DESCRIPTORS: *Rocket propelled sleds, Yaw, Stability (Lateral), Damping, Tests, Analog computers, Mathematical analysis, Test facilities, Motion.

Some results are presented of an analog computer study concerned with the motion of a rocket sled configuration within a prescribed velocity profile. The motion of the sled was sidewise restricted by slippers running on rails. The dynamic properties of the sled were studied under idealized conditions; it was assumed that the moving body has only 2 degrees of freedom; namely, lateral displacement and yaw. The body's weathercock stability was varied from negative to positive values as it was assumed that this aerodynamic property influences the mode of motion. The effects of damping and that of play between slipper and rail were studied to obtain indications as to how these parameters affect the motion. (Author)

AD-287 289 Div. 30, 26
(TISTE/CRJ) OTS price $1.10

Aerospace Information Div., Washington, D. C.
QUALITY OF SOVIET MEASURING INSTRUMENTS,
16 Oct 62, 2p. (AID rept. no. 62-165 Trans. from Measuring Instruments and their Quality. Standartizatsiya, No. 7, pp. 11-13, 1962 and Chinenov, M. M. Kazan' plant ''Teplokontrol'' is Violating the State Standard. Standartizatsiya No. 4, pp. 51-52, 1962)
Unclassified report

DESCRIPTORS: *Instrumentation, Measurement, Milling machines, Grinders, Lathes, Machine tools, Pressure gages, Manometers, USSR.

AD-287 414 Div. 30
(TISTE/OHD) OTS price $4.60

Armour Research Foundation, Chicago, Ill.
INSTRUMENTATION AND MEASUREMENT TECHNIQUES STUDY.
Quarterly progress rept. no. 14, 1 May-31 July 62, by A. T. Ashby. 31 July 62, 44p. incl. illus. table. (Rept. no. ARF 5112-Q14)
(Contract DA 36-039-sc-78269, Proj. 3G89-01-021-01) Unclassified report

DESCRIPTORS: *Measurement, *Instrumentation, Transmission lines, Test methods, Electromagnetic wave reflections, Analysis, Pulse generators, Pulse analyzers, Storage tubes, Field wire communication systems, Correlation techniques, Transistors, Circuit testers, Sidebands, Hall effect, Modulation, High-pass filters, Low-pass filters, Phase shifters, Distortion, Electrical equipment, Test equipment.

The location of faults on open wire transmission lines utilizing the pulse-echo technique is discussed. A storage type oscilloscope and correlation method are described. A method of testing for transistor leakage current while the device is still incorporated in a circuit was developed. Several techniques for in-circuit testing are suggested. The equipment is capable of measuring in-circuit leakage of one microampere for circuit impedances down to 10 ohms. The breadboard circuitry used to generate wideband quadrature audio signals using Hall elements is described. Quadrature signals were observed over the range of 350 to 3500 cycles. (Author)

AD-287 428 Div. 30, 1, 12
(TISTA/SEB) OTS price $10.10

Case Inst. of Tech., Cleveland, Ohio.
THE DESIGN, DEVELOPMENT AND TESTING OF AN EXTREMELY SENSITIVE ACCELEROMETER.
Final rept., Sep 60-May 62,
by William R. Baker, Jr. and David A. Clutz.
May 62, 116p. incl. illus. refs. (Rept. no. EDC 5-62-4)
(Contract AF 33(616)7285, Proj. 4431)
(ASD TDR 62-532) Unclassified report

DESCRIPTORS: *Accelerometers, Design, Electric fields, Surface tension, Voltage, Acceleration, Electrolytes, Measurement, Feasibility studies, Mercury, Capillary tubes.

The design of a novel force balance accelerometer using electrocapillary surface force on a mercury drop, capable of giving a linear voltage output for accelerations from 1 G to 0.00001 G with sensitivity of 0.00001 G, is discussed. The feasibility of the design is shown and test results for the device are given. The electrocapillary device uses a Hg drop as the seismic mass and an electrocapillary phenomenon as a null balance force. Electrocapillarity as applied in this work is the change in surface tension (in this case on a Hg drop electrolyte interface) as the electric field in the electrolyte containing the Hg is varied. The changes in surface tension over the Hg drop produce a surface flow which couples with the electrolyte to give a surface force which can propel the drop through the electrolyte. Theoretically, this force is a function of the electric field intensity seen by the drop, and the voltage which produces this field can balance a given acceleration. This voltage is then a measure of the acceleration. (Author)

Division 30 - RESEARCH AND RESEARCH EQUIPMENT

AD-287 527 Div. 30
(TISTB/SAT) OTS price $4.60

RAND Corp., Santa Monica, Calif.
SOME TACTICAL PROBLEMS IN SIMULATION METHOD,
by R. W. Conway. Oct 62, 35p. incl. illus. table (Research memo. no. RM-3244-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Digital computers, *Simulation, Programming, Probability, Sampling.

AD-287 552 Div. 30, 25
(TISTP/WH) OTS price $5.60

Cornell U., Ithaca, N. Y.
THE PERFORMANCE OF A GM COUNTER IN THE 200A REGION,
by D. L. Ederer. Sep 62, 47p. incl. illus. 12 refs. (Technical rept. no. 9)
(Contract Nonr-40137, Proj. NR 017-625)
Unclassified report

DESCRIPTORS: *Radiation counters, *X rays, *Photonuclear reactions, *Photons, *Electrons.

This investigation was undertaken to see if a GM counter could be made to operate at the longer wavelengths (about 200A); and if so, to determine if the counting rate was due primarily to photoelectrons ejected as a result of the absorption of incident photons and not due to extraneous effects. (Author)

AD-287 560 Div. 30, 25
(TISTM/EJH) OTS price $2.60

Pennsylvania State U. Mineral Industries Experiment Station, University Park.
STUDY OF PRESSURE DISTRIBUTION IN OPPOSED ANVIL CONFIGURATIONS,
by Mark Myers, Frank Dachille and Rustum Roy. 26 July 62, 14p. illus. 6 refs. (Technical rept. no. 16)
(Contract Nonr-65620) Unclassified report

DESCRIPTORS: *High pressure research, *Crystals, *Laboratory equipment, *Calibration, Test methods, Thin films, Thickness, Electrical properties, Mechanical properties, Resistance, Measurement, Bismuth, Barium, TKHALLIUM, Phase transitions, Loading, Lead distribution.

Anvil designs based on Bridgman patterns provide one of the most widespread methods for attaining ultra-high pressures; an evaluation of calibration procedures was carried out. Temperature, sample size and geometry dominate the large variables possible in an electrical measurement calibration. If phase equilibria studies at 500 C are of interest, a ''calibration'' should not be made with AgCl and 25 C. The principal importance of the electrical resistance calibration points is their widespread use. Their value in calibration for crystal chemical studies at high temperatures is seen to be very limited. The pressure multiplication factor for a particular diameter-to-thickness ratio was shown to depend on the mechanical properties of the sample materials. Thus the actual values of pressure multiplication factors related diameter-to-thickness ratio are only valid for the sample geometries and materials used in this study. The general relationship between pressure multiplication and diameter-to-thickness ratio was observed over a wide range of sample geometries and materials. (Author)

AD-287 723 Div. 30
(TISTP/WH) OTS price $3.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE CALCULATION OF THE SIMPLEST OPTIMUM RELAY SYSTEMS OF THE SECOND ORDER,
by A. A. Pavlov and V. P. Poputsillo. 20 Sep 62, 30p. incl. illus. tables, 29 refs. (Trans. no. FTD-TT-62-877 from Automatic Control and Computer Techniques, Part 3, pp. 419-444, 1960, Mashgiz, Moscow)
Unclassified report

DESCRIPTORS: *Control systems, *Feedback, *Differential equations, *Relays, USSR.

The problem of finding the optimum control law and of determining the structure of the optimum controlling portion of an automatic control system is treated. According to the general theory, an optimum process of a relay automatic control system, the roots of the characteristic equation of which are real (including the zero roots), consists of two intervals. Instead of an (n - 1)-dimensional switching hypersurface in an n-dimensional phase space, there is a switching line on a phase plane. In the case of optimum second-order systems the switching line on the phase plane of error coincides with the branches of the phase trajectories going towards the origin. If the roots of the characteristic equation of the linear part of an automatic control system are conplex, an optimum process (depending on the initial conditions) may consist of any number of intervals, and then the branches of the phase trajectories going towards the origin constitute only a part of the optimum switching line. Thus, in principle, the task of synthesizing the optimum control portion of a second-order automatic control system may be readily solved by the phase-plane method. (Author)

AD-287 732 Div. 30, 8, 15
(TISTB/CCH) OTS price $5.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
NEWS OF THE ACADEMY OF SCIENCES SSSR, DEPARTMENT OF TECHNICAL SCIENCES, POWER ENGINEERING AND AUTOMATION (SELECTED ARTICLES),
9 Oct 62, 56p. incl. illus. refs. (Trans. no. FTD-TT-62-871 from Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, Energetika i Avtomatika, No. 5, pp. 7-12, 25-37, 113-122, 1961)
Unclassified report

DESCRIPTORS: *Control systems, *Engineering, Nonlinear systems, Mathematical analysis, Automation, USSR, Remote control systems, Differential equations, Linear systems, Theory, Feedback, Automatic.

Contents: On polyinvariance in automatic control systems. On invariance of stabilization and reproduction systems relative to several disturbances. Analysis of transient and steady-state processes in pulse-relay and minimax systems with constant and variable control periods.

AD-287 776 Div. 30, 25, 15
(TISTP/WH) OTS price $6.60

New York U. Coll. of Engineering, N. Y.
SURF REFRACTION. COMPUTER REFRACTION PROGRAM, Final rept.,
by Emanuel Mehr. Sep 62, 1v. incl. illus. tables, 2 refs.
(Contract N189(188)5411A)
Unclassified report

DESCRIPTORS: *Programming, *Refraction, *Water waves, *Numerical methods and procedures, *Statistical analysis, Propagation, Difference equations, Bessel functions, Matrix algebra.

The programming in FORTRAN of refraction diagrams is treated. The basic algorithm is essentially that of the Kelvin method of circular arcs which was recently formulated for digital computing by Griswold and Nagle. (Author)

AD-287 786 Div. 30, 15
(TISTP/WH) OTS price $1.60

RAND Corp., Santa Monica, Calif.
A NOTE ON STABLE, PHYSICALLY REALIZABLE, LINEAR, TIME INVARIANT SYSTEMS,
by Nelson Wax. Oct 62, 13p. 12 refs. (Research memo. no. RM-3333-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Control systems, *Feedback, *Servomechanisms, *Integral transforms, *Integral equations, Linear systems.

A time invariant system is said to be physically realizable if its unit impulse response, h(t), is zero for t < 0. It is often assumed in treatments of physical realizability that the Fourier transform of h(t) is square integrable (L sub 2 (neg. infinity, pos. infinity)). Some use is then made of the regularity of the transform for real frequencies, to derive further properties of the transform. The condition that the system be stable leads to a different assumption, that the absolute value of h(t) be integrable (is L (negative infinity, positive infinity)); this implies only uniform continuity of the transform for real frequencies. Physically realizable, stable systems are discussed, and several necessary, and a few sufficient, conditions on the Fourier transform of h(t) are summarized. In particular, the behavior of the transform for complex frequencies, the Bode relations, and the Paley-Wiener criterion are reviewed. (Author)

AD-287 884 Div. 30
(TISTP/FR) OTS price $.50

Aeronautical Research Lab., Office of Aerospace Research, Wright-Patterson Air Force Base, Ohio.
A PORTABLE LOW LEVEL LIGHTMETER.
Report on Quantum Nature of Light,
by R. K. H. Gebel. Aug 62, 8p. incl. illus.
(ARL 62-415, supersedes AD-260 500)
(Proj. 7072)
Unclassified report

DESCRIPTORS: *Photometers, Photomultipliers, Voltage amplifiers, Power supplies.

The operation and calibration of a portable low level lightmeter designed in connection with the work on the problems of light amplification is discussed. This lightmeter can be used to determine the light levels from as low as 10 to the -8th power foot-Lamberts. (Author)

AD-287 895 Div. 30
(TISTP/JW) OTS price $7.60

International Business Machines Corp., Rockville, Md.
IMPROVED PHASE MODULATOR-DEMODULATOR.
Final rept.,
by John G. Puente. 31 Aug 62, 76p. incl. illus.
(Contract DA 36-039-sc-87248)
Unclassified report

DESCRIPTORS: *Data transmission systems, *Modulators, *Telephone communication systems, *Phase modulation, Electronic circuits, Digital systems, Phase shifters, Pulse generators, Design.

The phase modulator-demodulator design is based on the original work done by Dr. Emil Hopner of IBM. This basic work was used to design a FIELDATA compatible improved phase modulator-demodulator. The problem of obtaining character synchronization in a reliable and automatic manner is discussed, and its solution is described. The analog and digital circuit design is described for the transmitter and the receiver and simple mathematical relationships are given. Results of laboratory testing using random data, white noise, and band-limiting are discussed, and the results plotted. A section of schematics, layouts, and diagrams for the modem is included. The modem which is undergoing evaluation has given satisfactory operation in its initial tests. Three areas are recommended for additional work: synchronous operation, higher data rate, and improved data reset circuits. (Author)

AD-287 898 Div. 30
(TISTP/FR) OTS price $4.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
FEATURE WORD CONSTRUCTION FOR USE WITH PATTERN RECOGNITION ALGORITHMS: AN EXPERIMENTAL STUDY.
Technical report on Mathematics,
by R. L. Mattson and O. Firschein. Aug 62, 34p. incl. illus. tables, 12 refs. (Rept. no. 6-90-62-58)
Unclassified report

DESCRIPTORS: *Reading machines, Digital systems, Vocabulary, Classification, Coding.

The experimental investigation of 'numerical' feature words based on 'yes-no' tests, where portions of the word represent quantitative answers to pattern processing questions, is described. Two types of feature-word coding, binary and linear, are discussed and their effects on recognition presented. A method of simplifying the feature word construction by noting the distribution of the weights obtained for the linearly coded feature words is also given. (Author)

31. SHIPS AND MARINE EQUIPMENT

AD-287 226 Div. 31, 9
(TISTE/CRJ) OTS price $4.60

St. Anthony Falls Hydraulic Lab., U. of Minn., Minneapolis.
TANDEM INTERFERENCE EFFECTS OF FLAT NONCAVITATING HYDROFOILS,
by J. M. Wetzel and W. H. C. Maxwell. May 62, 50p. incl. illus. 12 refs. (Proj. rept. no. 61)
(Contract Nonr-71041, Proj. SF 013 02 01)
Unclassified report

DESCRIPTORS: *Hydrofoils, *Hydrofoil boats, Lift, Drag, Tests, Theory, Interference, Test facilities, Oscillation, Hydrodynamics.

Experimental measurements were made of the interference effect of two submerged, flat, noncavitating hydrofoils of finite span in tandem. The surface wave generated by a single foil was measured in the longitudinal and lateral directions. Downwash angles were determined from the experimental data for various foil separations

and submergences. Comparison of the results with theory was favorable. Limited measurements were also made of the oscillatory lift and drag forces for a foil moving through a progressive wave train. The data agreed with quasi-steady theory for the lower frequencies of encounter. At the higher frequencies of encounter, consideration of unsteadiness effects improved the correlation. (Author)

AD-287 662 Div. 31
(TISTB/MS) OTS price $3.60

Radio Corp. of America, Harrison, N. J.
PRODUCTION ENGINEERING MEASURE FOR TUBE TYPE 7587.
Quarterly progress rept. no. 1, 1 June-31 Aug 62, by W. Ackermann. 31 Aug 62, 29p. incl. illus.
(Contract DA 36-039-sc-86732)
Unclassified report

DESCRIPTORS: *Production, *Electron tubes, *Machines, Automatic, Management engineering, Industrial research, Machine shop practice, Design, Test equipment, Manufacturing methods.

The purpose of this contract is to obtain high volume, low cost manufacturing capability for the Nuvistor tube type 7587 by the creation of several critical equipment facilities. The subject facilities should inherently contain sufficient flexibility to not only service the tetrode line of Nuvistors, but also a broad spectrum of existing triode types and contemplated future types, such as long leaded Nuvistors. Three main tasks to be evaluated are: (1) an automatic banded truss grid winding and brazing machine, (2) an automatic exhaust machine, and (3) a semi-automatic lead loader. (Author)

AD-287 860 Div. 31
(TISTW/RD) OTS price $4.60

Naval Submarine Base, New London, Conn.
RECOMMENDED PRESCRIBED VIBRATION AND NOISE LIMITS FOR AUXILIARY MACHINERY ABOARD SUBMARINES USING THE GR 1551-A SOUND LEVEL METER AND PROBE, by Robert York Chapman. 1 Oct 62, 33p. illus. tables, 9 refs. (Technical rept. no. 213-62, rev. 4; Supersedes technical rept. no. 203-60, AD-259 225)
(Proj. S-F013-11-01)
Unclassified report

DESCRIPTORS: *Submarine noise, Vibration, Machines, Shipborne, Sound, Meters, Noise analyzers, Noise, Reduction, Measurement.

Efforts continued to establish recommended vibration and noise levels for auxiliary machinery as measured with the general radio sound level meter, control box and a vibration pickup using the probe and magnet attached. The enclosed revised 'Chapman Numbers' for auxiliary machinery aboard 571/578 class nuclear and all conventional class submarines were plotted from all presently existing recorded noise level readings made available to this command. These numbers were obtained from the levels produced by shipboard GR-1551-A/B sound level meter probe measurement surveys conducted on rotating auxiliary machinery operating in good and bad condition. From the accumulated percentages plotted by established procedures, a fifty percent factor, for use as a standard, was selected. It is assumed that if fifty percent can be good, then it should not impose too much of a hardship on repair activities to continue to achieve these levels. (Author)

32. MISCELLANEOUS ARTS AND SCIENCES

AD-287 175 Div. 32
(TISTB/AW) OTS price $11.50

RAND Corp., Santa Monica, Calif.
ECONOMICS DEPARTMENT PUBLICATIONS, 1948-1962: AN AUTHOR INDEX OF THE OPEN LITERATURE, WITH ABSTRACTS,
by Harriett Porch. Oct 62, 1v. (Memo. no. RM-2800-1)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: *Bibliography, *Economics, Indexes, Costs, Production, Industrial production, Wages, Linear programming, Industry, Theory, Analysis, France, Iron, Steel, Paints, Petroleum industry, Chemical industry, Cements, Brick, Wood, Food, Morocco, Civilian defense systems, Vulnerability, USSR, China, Water supplies, Labor, Money, Electric power production.

An author index for RAND Economics Department publications available in the open literature is given. It extends in time from the Department's establishment in 1948 to the date of compilation--September 30, 1962. It includes monographs (books and reports), less formal monographs or working papers (RAND Memoranda), and journal-type professional contributions (Papers). A comprehensive index of RAND open-literature publications can be found elsewhere in the RAND Index of Publications (August 2962). The present index has as its basic reference list complete bibliographical entries with abstracts, arranged under authors' names. (Author)

AD-287 189 Div. 32
(TISTW/PCR) OTS price $6.60

Army Research Office, Durham, N. C.
PROCEEDINGS OF THIRD ORDNANCE LIBRARIANS WORKSHOP, 31 MARCH-1 APRIL 1960.
1962, 63p. incl. illus. 8 refs.
Unclassified report

DESCRIPTORS: *Library science, *Libraries, Reports, Information retrieval, Procurement, Catalogs, Classification, Distribution, Standardization, Ordnance laboratories.

The Third Ordnance Librarians' Workshop was held at the Office of Ordnance Research, U. S. Army, Duke University, Durham, North Carolina, on 31 March-1 April 1960. Subject matter covered a wide area: forthcoming regulations, mechanized information processing, cataloging, purchasing, statistics and better relationship between the Ordnance Corps and other Department of Defense activities. (Author)

AD-287 190 Div. 32
(TISTB/LMH) OTS price $4.60

Deputy Commander Aerospace Systems, Air Force Systems Command, Inglewood, Calif.
DCAS SCIENCE ABSTRACTS. VOLUME I. NUMBER 1.
15 Oct 61, 48p.
Unclassified report

DESCRIPTORS: *Scientific reports, *Bibliography, Aircraft, Astronomy, Chemistry, Communication systems, Detection, Electrical equipment, Fluid mechanics, Fuels, Guided missiles, Materials, Mathematics, Medical research, Metallurgy, Military operations, Nuclear energy, Ordnance, Photography, Physics, Propulsion, Psychology.

AD-287 553 Div. 32, 30
(TISTP/WH) OTS price $3.60

Computer Associates, Inc., Woburn, Mass.
ON SYNTACTIC ANALYSIS AND OPERATOR PRECEDENCE,
by Robert W. Floyd. Sep 62, 31p. incl. illus. 6 refs. (Scientific rept. no. 1)
(Contract AF 19(628)419, Proj. 4641)
(AFCRL 62-738) Unclassified report

DESCRIPTORS: *Digital systems, *Programming, *Language, *Philogoy, *Matrix algebra.

Three increasingly restricted types of formal grammar are phrase structure grammars, operator grammars, and precedence grammars. Precedence grammars form models of mathematical and algorithmic languages which may be analyzed mechanically by a simple procedure based on a matrix representation of a precedence relation between character pairs. (Author)

AD-287 764 Div. 32
(TISTB/SAT) OTS price $1.60

Amarillo Technical Training Center (ATC), Amarillo Air Force Base, Tex.
METHODOLOGICAL PROBLEMS IN ASSESSING EX-PRISONERS. EXPERIENCES OF THE 3320TH RETRAINING GROUP,
by Leonard J. Hippchen. Apr 62, 11p. 26 refs.
Unclassified report

Presented at the annual meeting of the Sociological Association, Apr 1962, Dallas, Tex.

DESCRIPTORS: *Criminology, Corrections, Military personnel, Psychology, Military psychology, Air Force.

An attempt is made to clarify what appears to be the underlying dilemma behind much of today's correctional research. It also explained how the 3320th Retraining Group is attempting to cope with this problem by devising research methodologies which are more adequate to measuring the effectiveness of the Group program. The major problem behind the inadequate methodologies in use by many correctional institutions was seen to be related to confused goal concepts. This confusion in goal concepts is related to a transition that sees correctional institutions moving from a punishment-protection to a rehabilitation-treatment orientation. Apathy and misunderstanding on the part of the public was seen to be the major factor behind the slowness of this transition. It was indicated that although the 3320th Retraining Group has been committed to the rehabilitation-treatment approach from the beginning of the program ten years ago, development of adequate methodologies has been slow. It was explained that the early research approaches obtained only rough measures of operational effectiveness. However, current and projected research plans involve use of the more complex methodologies. The research program still is in its infant stages. (Author)

AD-287 809 Div. 32
(TISTB/LMH) OTS price $6.60

Chicago U., Ill.
THE RATIO OF SUPPORT TO PROFESSIONAL MANPOWER IN R AND D LABORATORIES.
Research rept.,
by Ralph Andrea. Aug 62, 57p. incl. table, refs.
(Contract AF 33(608)661)
Unclassified report

DESCRIPTORS: *Government employees, *Professional personnel, *Engineering personnel, *Management engineering, Military research, Scientific research, Scientific organizations, Scientific personnel, Anxiety, Applied psychology, Job analysis, Air force operations, Effectiveness, Attitudes, Needs.

The author suggests that the amount of assistance on routine duties given to an R & D engineer is important to retention. A measure of this assistance is the ''support ratio''. Examination was made of current support ratios in 219 companies and in 137 departments of the Air Force Systems Command. In general, the current modal support ratio is about 1.0 for industry and about 0.3 for Systems Command. This suggests that other factors being equal, professional minded scientists and engineers might be tempted to move to organizations that offer help -- not hindrance. The economics of using a high salaried engineer to type his own reports is discussed. Frustrations encountered in a multilayer R & D organizational structure are emphasized in terms of retention. (Author)

33. TRANSPORTATION

AD-286 984 Div. 33
(TISTA/GEC) OTS price $2.60

Operations Research Center, U. of Calif., Berkeley.
AIRPORT RUNWAY CAPACITY AND DELAYS--I,
by Robert M. Oliver. 28 Aug 62, 26p. incl. illus. 10 refs. (Research rept. no. 25, IER 172-28)
(Contract Nonr 22283)
Unclassified report

DESCRIPTORS: *Runways, *Airports, *Air traffic, Scheduling, Airplane landings, Take-offs, Statistical analysis, Statistical distribution.

When both landing and departing aircraft use a single runway the flow capacity and the delays to aircraft depend on the operating rules which govern use of the runway. In this paper the author analyses those situations where landing aircraft have priority over departures but where departures must satisfy several minimum spacing requirements before they can be interposed between landings. By assuming that interarrival times of landing aircraft are independently sampled random variables, from a translated exponential distribution, solutions are obtained for the total movement capacity and the delays to departures at a single runway. (Author)

AD-287 782 Div. 33
(TISTM/TCG) OTS price $1.10

Drexel Dynamics Corp., Horsham, Pa.
CONVEYOR, ROLLER, GRAVITY 1000 POUNDS PER FOOT CAPACITY.
Final rept.
14 Sep 62, 6p. (Rept. no. T-62-1)
(Contract DA 19-129-qm-1949)
Unclassified report

DESCRIPTORS: *Conveyors, *Roller bearings, *Gravity, Aluminum alloys, Shaft couplings, Design.

The gravity roller conveyor design as investigated by Drexel Dynamics Corporation consisted of an all-aluminum section, 116-5/8-in long, containing 20 2-1/4-in OD rollers mounted through bearings on 5/8-in hexagonal shafts. The shafts were joined to the side frames by reworked AN-415 lock pins. Junction of 2 or more sections was accomplished by engagement of the hinge assemblies located at diagonal corners of the conveyor section. (Author)

NON-MILITARY AND OLDER MILITARY RESEARCH REPORTS

*Descriptors marked with an asterik are included in the subject index.

ASTRONOMY

NASA N62-16389 $2.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THERMAL HISTORY OF THE MOON AND OF THE TERRESTRIAL PLANETS, by Zdenek Kopal. Rept. on Contract NASw-6. 1 May 61, 28p. 22 refs. Technical rept. no. 32-108.

AD-279 203 $8.10

Oklahoma State U. Research Foundation, Stillwater.
A STUDY OF LINE INTENSITIES IN THE SPECTRUM OF THE STAR for punching: EPSILON-LEONIS, by Ray L. Fisher (Master's thesis) and Leon W. Schroeder. Technical rept. no. 1 on Grant Nonr(G)-00017-61. Feb 62, 86p. 22 refs.

DESCRIPTORS: *Stars, *Spectrographic data, Astronomical data, *Solar atmosphere, Absorption spectra, Absorption, Scattering, Temperature, Theses.

This paper is concerned with the analysis of the stellar atmosphere of ϵ -Leonis by means of curves of growth, a method termed "grobanalysis" by German workers. This study has been limited to lines of Fe I, Ti I, and Cr I. The wavelength range covers $\lambda\lambda$ 4000-5450.

BEHAVIORAL SCIENCES

AD-279 496 $3.60

Human Engineering Labs., Aberdeen Proving Ground, Md.
MUZZLE BLAST MEASUREMENTS ON XM81 GUN-LAUNCHER, by John D. Waugh and Howard H. Holland, Jr. Dec 61, 34p. 8 refs. Technical memo. 20-61.

DESCRIPTORS: Weapons, *Rocket guns, Guns, Rocket launchers, Blast, Shock waves, Measurement, *Gun barrel attachments, *Human engineering, *Auditory acuity, Military personnel.

An evaluation is presented of the effects of gun-blast upon exposed crew and supporting infantry on and around a tank-mounted XM81 gun-launcher. Measurements were taken using piezoelectric pressure-sensitive gages. Results are compared with known data on the limits of human tolerance. It is recommended that the wearing of the V-51R earplug be mandatory for the gun-launcher crew members and supporting infantry when the weapon is being fired. (Author)

Personnel and Training

AD-279 952 $2.60

American Inst. for Research, San Mateo, Calif.
THE EFFECT OF RESPONSE CHARACTERISTICS AND MULTIPLE-CHOICE ALTERNATIVES ON LEARNING DURING PROGRAMED INSTRUCTION, by Benjamin J. Burton and Robert A. Goldbeck. Technical rept. no. 4 on Contract Nonr-3077(00). Feb 62, 21p. 5 refs. Rept. no. AIR-C28-2/62-TR.

DESCRIPTORS: *Learning, *Programming, Conditioned reflex, Students, Tests, Statistical analysis, Analysis of variance, Training, Teaching machines.

This report represents a more specific conceptualization of the interpretation previously offered concerning the superiority of the overt response mode for moderately difficult items, with special reference to the number and strength of response alternatives considered by the subject before responding to the blanks in the frames.

AD-279 183 $1.60

Civil Aeromedical Research Inst., Oklahoma City, Okla.
PROBLEMS IN AIR TRAFFIC MANAGEMENT: II. PREDICTION OF SUCCESS IN AIR TRAFFIC CONTROLLER SCHOOL, by Bart B. Cobb, Jr. Feb 62, 17p. 4 refs. Rept. no. 62-2; NASA N62-10354.

DESCRIPTORS: *Air traffic controllers, *Aviation personnel, Training, Selection, Achievement tests, Applied psychology, Statistical functions.

An analysis of scores for an extensive battery of psychological tests administered to a large number of air traffic controller (ATC) trainees indicated that such tests can make a useful contribution in the selection of personnel for ATC training. Five test areas which emerged as most predictive of ATC school performance were: abstract reasoning, numerical ability, spatial relations, non-verbal analogies, and a specially designed test of air traffic control problems. (Author)
(See also AD-268 954)

SC-4682(M) $3.60

Sandia Corp., Albuquerque, N. Mex.
THE VALIDITY AND DIMENSIONS OF DESCRIPTIVE STATEMENTS USED IN EMPLOYEE PERFORMANCE APPRAISALS. Mar 62, 43p. 13 refs.

AD-280 450 $2.60

University of Southern California, Los Angeles.
THE RELATIVE EFFICIENCY OF DIFFERENT COMBINATIONS OF PROMPTING AND CONFIRMATION FOR LEARNING A BOOLEAN ALGEBRA PROGRAM, by Joseph W. Rigney and Irving J. Budnoff. Technical rept. no. 34 on Contract Nonr-228(22). Feb 62, 28p. 9 refs.

DESCRIPTORS: *Learning, *Programming, *Algebras, Mathematics, Students, Tests, Conditioned reflex, Statistical analysis, Analysis of variance, Training, Effectiveness, Teaching machines.

This study investigated the effects of prompting (P) and confirmation (C), and of three combinations (PP, PC, and CC) of these in the learning of a Boolean algebra program. Despite the uniform requirements of all subjects to write in responses to frames, training times for the treatment combinations involving confirmation (CC and PC) were significantly longer than those for the double prompting condition (PP).

Psychology

AD-280 452 $3.60

Center for Research on Social Behavior, U. of Delaware, Newark.
AN ANALYSIS OF RESPONSIVENESS BETWEEN NATIONS, by Dean G. Pruitt. Technical rept. no. 5 on Contract Nonr-2285(02). 1 Dec 61, 36p. 12 refs.

DESCRIPTORS: *Political science, *Social communication, *Group dynamics, Games theory, Attitudes, *Foreign policy.

AD-280 680 $2.60

Center for Research on Social Behavior, U. of Delaware, Newark.
EXPLORATIONS IN THE PROCESS OF PERSON PERCEPTION; VISUAL INTERACTION IN RELATION TO COMPETITION, SEX AND N AFFILIATION, by Ralph V. Exline. Technical rept. no. 8 on Contract Nonr-2285(02). 15 May 62, 30p. 20 refs.

DESCRIPTORS: Perception, *Visual perception, Sex, Vision, Visibility, Group dynamics, *Social communication, Behavior, Personality, Sociometrics.

This study represents an exploratory investigation of patterns and correlates of visual interaction in face to face groups. Sixteen groups of three men and 16 groups of three women, categorized by degree of n affiliation and further differentiated by the competitiveness of the group setting were compared along various dimensions of visual interaction recorded while they worked on a group discussion task. Especial attention was given to the phenomenon of mutual visual interaction, which was assumed to be coordinate with a momentary intimacy. Interrelationships among personal attributes, competitive situations and mutual glances were tested by visual interaction data which observers recorded on a multichannel operations recorder. Data showed (1) a rather high degree of agreement among observers who recorded patterns of visual interaction; (2) that women looked significantly more at one another than did men in total, while speaking, while being spoken to, and when simultaneous glances were measured; and (3) that a first analysis showed sex and n affiliation interacted to affect mutual glances. (Author)

AD-280 605 $3.60

Center for Research on Social Behavior, U. of Delaware, Newark.
THE RELIABILITY OF CODING, by Barbara H. Long. Technical rept. no. 7 on Contract Nonr-2285(02). 1 May 62, 37p. 11 refs.

DESCRIPTORS: *Coding, *Reliability, Classification, Psychology, Correlation techniques.

Whenever natural phenomena are observed scientifically, the objects or events observed must be placed into categories. The reliability of this categorization process is an important consideration, especially when the coding is done by a human observer rather than by an instrument. This is a review of recent methods, for determining the reliability of coding.

AD-279 937 $2.60

Human Factors Research, Inc., Los Angeles, Calif.
HUMAN PERFORMANCE DURING FIVE DAY CONFINEMENT, by James J. McGrath, Clinton H. Maag and others. Rept. on Human Factor Problems in Anti-Submarine Warfare, Contract Nonr-2649(00). Jan 62, 21p. 11 refs. Technical memo. 206-14.

DESCRIPTORS: Behavior, Reaction (Psychology), Submarine personnel, *Atmosphere, *Oxygen, Time, *Confinement, *Sensory deprivation, *Adjustment (Psychology).

The missions of submarines, tanks, aircraft, and space vehicles demand that their operators perform efficiently during long periods of confinement to an environment restricted in space, sensory stimulation, or social contact. This requirement has led to increased research on the effects of sensory deprivation, isolation, and confinement on human performance capabilities. The purpose of this study was to describe the performances of two men during 120 hours of continuous confinement in a low-pressure, pure-oxygen atmosphere. (Author)

AD-279 862 $4.60

Kansas State U., Manhattan.
THE EVOLUTION OF PERCEPTUAL FRAMES OF REFERENCE, by William Bevan. Technical repts. 1-4 on Contract Nonr-3634(01). Feb 62, 46p. 90 refs.

DESCRIPTORS: Psychology, *Adjustment (Psychology), Stimulation, Behavior, *Visual perception, *Auditory signals, Vision, *Visual thresholds, Conditioned reflex, Verbal behavior, *Reasoning.

Contents:
Technical rept. no. 1. The pooling mechanism and the phenomena of reinforcement
Technical rept. no. 2. The effect of visual intensities upon the judgment of loudness
Technical rept. no. 3. The influence of context upon the estimation of number
Technical rept. no. 4. Subliminal stimulation and the judgment of magnitude

AD-279 861 $2.60

Kansas State U., Manhattan.
THE EVOLUTION OF PERCEPTUAL FRAMES OF REFERENCE, by William Bevan. Technical repts. 5-6 on Contract Nonr-3290(01). Feb 62, 23p. 11 refs.

DESCRIPTORS: *Adjustment (Psychology), *Perception, Stimulation, Conditioned reflex, *Transfer of training, *Hypnosis, Learning, *Reasoning, Behavior.

Contents:
Technical rept. no. 5. The simultaneous induction of multiple anchor effects in the judgment of forms
Technical rept. no. 6. The influence of hypnotically-induced expectancies upon anchor effectiveness
(See also AD-279 862)

AD-279 598 $1.10

Louisiana State U., Baton Rouge.
TASK ABILITY AND EFFECTIVE LEADERSHIP, by George J. Palmer, Jr. Technical rept. no. 4 on Leadership and Organizational Behavior Test of Proposed Theory, Contract Nonr-1575(05). Jan 62, 10p. 2 refs.

DESCRIPTORS: *Leadership, Group dynamics, Intelligence tests, Behavior, Effectiveness, Tests, Theory.

Leadership, for Bass (1960), is successful when attempts to influence have the effect of changing behavior, and leadership is effective when successfully changed behavior results in goal attainment. It has been hypothesized that effective leadership depends to considerable degree on task ability. This paper presents evidence concerning the form and magnitude of this relationship. (Author)

AD-281 067 $1.60

Louisiana State U., Baton Rouge.
TASK ABILITY AND SUCCESSFUL AND EFFECTIVE LEADERSHIP, by George J. Palmer, Jr. Technical rept. no. 6 on Leadership and Organizational Behavior Test of a Proposed Theory, Contract Nonr-1575(05). May 62, 11p. 3 refs.

DESCRIPTORS: *Leadership, Theory, Behavior, Group dynamics, Intelligence tests, Effectiveness, Students, Tests.

Task ability made significant contributions to both successful leadership, accounting for 44 per cent of the variance, and to effective leadership, 69 per cent of the variance. Task ability contributed, as expected, significantly more (25 per cent more) to effective leadership than to successful leadership. Followship was, as predicted, substantially better accounted for by low ability than leadership was by high ability. This was true of both kinds of leadership, but was more pronounced in the case of successful leadership.

AD-279 848 $1.60

Louisiana State U., Baton Rouge.
TEST OF A THEORY OF LEADERSHIP AND ORGANIZATIONAL BEHAVIOR WITH MANAGEMENT GAMING, by George J. Palmer, Jr. Annual rept. no. 2 on Leadership and Organizational Behavior Test of a Proposed Theory, Contract Nonr-1575(05). 15 Nov 61, 14p. 5 refs.

DESCRIPTORS: Behavior, Tests, *Leadership, *Management engineering, *Games theory, Sociometrics, Group dynamics, Theory.

Contents:
Management gaming
Interpersonal knowledge and similarity
Studies of real-life organizations
The behavior of individuals and groups in decision-making situations

AD-280 600 $2.60

Navy Medical Neuropsychiatric Research Unit, San Diego, Calif.
ATTITUDE CHANGES IN SMALL GROUPS UNDER PROLONGED ISOLATION, by E. K. Eric Gunderson and Paul D. Nelson. Mar 62, 22p. 4 refs. Rept. no. 62-2: BuMed MR005.12-2004.

DESCRIPTORS: *Attitudes, Behavior, *Group dynamics, Psychology, *Adjustment (Psychology), Climatic factors, Antarctic regions, Confinement.

The present research is concerned with the description of attitudes among men who have wintered over at small Antarctic stations. Comparisons are made of attitude levels among expedition groups at particular time periods and of changes in attitude levels over extended time periods. The major purpose of the study is to investigate the generality of attitude patterns and change among Antarctic small station groups.

AD-280 268 $3.60

Pennsylvania U. [Philadelphia].
AN EXTENSION AND EXPERIMENTAL ANALYSIS OF THE NEURAL QUANTUM THEORY, by Willard D. Larkin and Donald A. Norman. Rept. on Contract Nonr-551(37) and National Science Foundation Grants NSF G-8864 and G-17637. Feb 62, 37p. 15 refs. Memo. MP-14.

DESCRIPTORS: *Sensory perception, Theory, *Auditory perception, Auditory thresholds, Behavior, Quantum statistics, Sound generators.

It is argued that auditory sensory discrimination can be described by the quantum threshold concept modified by response bias. The present model is considered to be a reasonable first approximation. The power of the theory lies not in one or two good fits but in its consistent ability to describe a great many experiments with a minimum of "parameter juggling."

AD-281 650 $12.50

Psychology Lab., Pennsylvania State U. [University Park].
VIBRATORY COMMUNICATION: FEASIBILITY APPLICATION, by Alec J. Slivinske, Joseph G. Robertson and others. ONR Final technical rept. on TACCOM (8655), Contract Nonr-656(17). Oct 59, 172p. 83 refs.

DESCRIPTORS: *Vibration, *Communication systems, Feasibility studies, *Information theory, Data transmission systems, *Coding, Psychology, Stimulation, Signals, Transmission.

This is the final report of a three-year series of investigations designed to determine the feasibility of vibratory communication in an applied situation in the presence of competing tasks. This research was further concerned with designing coding techniques to implement vibratory information transmission for military application. These data are integrated into the conceptual framework of information theory with special attention to the information-handling capacities of the human receiver.

AD-279 409 $3.60

Small Groups Research Center, Washington, U., St. Louis, Mo.
THE INTERFERENCE-AGGRESSION LAW by Robert L. Hamblin, David A. Bridger and others. Technical rept. no. 16 on Contract Nonr-816(11) and PHS Grant M-3039. Feb 62, 32p. 24 refs.

DESCRIPTORS: Psychology, *Behavior, Interference, *Sociometrics, Reaction (Psychology).

The purpose of this study was to test two alternative hypotheses. The first, suggested by Dollard and his associates, is that instigation to aggression is a linear function of the amount of accumulated interference. The second, derived in an application of Stevens' psychophysical law, is that instigation to aggression is a power function of the amount of accumulated interference.

AD-280 611 $1.60

Texas A. and M. [Coll.] College Station.
THE MEASUREMENT OF AFFECTIVE RESIDUALS, by Warren C. Bonney (U. of Illinois) and Clay E. George (Human Resources Research Office, George Washington U.). Technical rept. no. 5 (Final) on Contract Nonr-2119(01). Sep 61, 14p. 6 refs.

DESCRIPTORS: *Adjustment (Psychology), Personality, *Group dynamics, Theory, Stimulation, Design, Effectiveness, Behavior, Personality tests, Test methods, Colors, Measurement.

AD-281 457 $3.60

Washington U., Seattle.
MULTIVARIATE MODELS FOR EVALUATING CHANGE, by Paul Horst. Rept. on Contract Nonr-477(33) and Public Health Research Grant M-743(C7). May 62, 32p. 2 refs.

DESCRIPTORS: *Psychometrics, Experimental data, *Statistical analysis, Model tests, Reliability, Matrix algebra.

BNL-5358 $1.60

Brookhaven National Lab., Upton, N. Y.
A SUBJECTIVE COMPARISON OF AMERICAN AND GREEK MEDICAL EDUCATION, by George C. Cotzias. [1961] 13p.

Anatomy and Physiology

AD-266 436 $1.60

Army Medical Research Lab., Fort Knox, Ky.
EVIDENCE FOR ASCENDING FIBERS IN THE PYRAMIDAL TRACT OF THE CAT, by Henry L. Batsel. Rept. on Neural and Endoctorine Responses to Environmental Variables. 1 Sep 61, 16p. 17 refs. Rept. no. 508.

DESCRIPTORS: *Brain, *Nerves, Electrical properties, Measurement, Tests, *Electroencephalography, Experimental data.

In chronic cerveau isolé preparations in which the basis pedunculi was the only collection of fibers connecting the two brain parts, it was found possible to evoke short lasting EEG activation. These results confirm recent anatomical findings which indicate that there are ascending fibers coursing with the pyramidal tracts. (Author)

AD-280 607 $1.10

Civil Aeromedical Research Inst., Oklahoma City, Okla.
PREDICTION OF ENERGY COST OF TREADMILL WORK, by P. F. Iampietro and Ralph F. Goldman (Army Research Inst. of Environmental Medicine). Apr 62, 6p. 3 refs. Rept. no. 62-5; NASA N62-11996.

DESCRIPTORS: *Physical fitness, Energy, Consumption, *Body weight, Body fats, Age factors.

The relative contributions of rate of progression (1.5 to 4.0 mph), grade (4 to 9%), and load (10 to 30 Kg), to the total energy cost of treadmill work were determined. The data obtained were integrated graphically with some of the available energy cost data in the literature. A useful graph is provided for estimating energy expenditure. It was tentatively concluded that for grade walking over the ranges studies, the energy cost per unit weight is essentially the same whether the weight is of the body or the load. The data are useful in that a correlation between the diverse literature reports on treadmill studies using different speeds and loads is made feasible. (Author)

AD-280 492 $3.60

Human Engineering Labs., Aberdeen Proving Ground, Md.
A METHOD FOR THE STUDY OF HEARING LOSS AND RECOVERY IN RHESUS MONKEYS, by Paul Martin, John J. Romba, and Hugh W. Gates. Apr 62, 32p. 6 refs. Technical memo. 11-62.

DESCRIPTORS: *Sensory perception, *Auditory perception, Deafness, Test methods, *Audiometry, Sound generators, Earphones, *Primates, Behavior, *Auditory acuity, Noise.

A method is described for the rapid and reliable measurement of the Rhesus monkey's auditory acuity. This method proved suitable for determining the animal's hearing loss and subsequent recovery. Two important factors of the method were: (1) the controlled presentation of the pure tone stimulus through earphones which are affixed to the animal by means of a newly developed phone holding device, and (2) the provision for obtaining a clearly defined indicator response. The method was evaluated in terms of the exposure of a monkey to one gun-generated noise impulse. Post-exposure audiograms were obtained rapidly and without difficulty. (Author)

AD-266 837 $1.60

Naval School of Aviation Medicine, Pensacola, Fla.
RADIATION TOLERANCE CRITERIA IN SPACE OPERATIONS, by Hermann J. Schaefer. Research rept. 1 Sep 61, 18p. 11 refs. Proj. MR005.13-1002, rept. no. 20

DESCRIPTORS: *Radiation tolerance, Space environmental conditions, Solar atmosphere, *Space flight, *Gamma rays, Measurement, Dose rate, Man, Laboratory animals, Survival, Safety, *Radiation injuries, Probability, Experimental data, *Radiobiology, Space medicine, *X-rays, Radiation effects.

Animal data of the literature pertinent to the problem are reviewed. They show that equal doses administered at lower dose rates or in a fractionated fashion produce a smaller acute injury. A realistic description of the exposure status of a person, therefore, requires distinction between accumulated gross exposure and actual net injury at any one time. If a maximum permissible net injury is agreed on, a time scale of increasing gross exposure could be established if reliable data on the recovery mechanism for man are available. It is shown that the latter prerequisite is not very satisfactorily fulfilled. A very comprehensive study with the special objective of arriving at the best balanced extrapolation to man has been conducted by Blair. He suggests a factor of 10 per cent for the nonrecoverable injury and a recovery half time of 25 days for man. The implications of Blair's model for the total permissible gross exposure as a function of time are analyzed for a maximum net injury of 80 rem. For time intervals of months or years the additional exposure allowance is substantial and approaches 720 rem asymptotically. The shortcomings of this model and the areas in which additional data are needed are pointed out. (Author)

AD-280 623 $4.60

Stanford U., Calif.
INVESTIGATIONS ON THE ESTIMATION OF HISTAMINE IN CARDIAC ANAPHYLAXIS, by Gerald G. Vurek and George A. Feigen. Annual interim progress rept. 1961-1962, on Contract [No]nr-225(46). Apr 62, 46p. 40 refs.

DESCRIPTORS: *Anaphylaxis, *Heart, Tissues (Biology), *Histamine, Determination, Antibodies, Adsorption, Sensitization, Biochemistry.

A specific, sensitive, and accurate method for the chemical determination of histamine is described. Also included is a method for the removal of materials which might interfere with the determination procedure. Apparatus and methods for the observation of the time course of release of histamine from isolated tissues undergoing anaphylaxis are discussed. Experiments are described which show there is a relationship between the bulk phase concentration of antibody and the amount of antibody bound to in vitro sensitized heart tissues, and that the degree of sensitization, as measured by histamine release, is a function of the bulk phase concentration. (Author)

Radiobiology

TID-16457 $1.25

Atomic Energy Commission. Div. of Biology and Medicine, Washington, D. C.
GAMMA RAY EXPOSURE DOSE TO NON-URBAN POPULATIONS FROM THE SURFACE DEPOSITION OF NUCLEAR TEST FALLOUT, by H. A. Knapp. 1 July 62, 53p. 24 refs.

UCRL-10211 $3.00

Lawrence Radiation Lab., U. of California, Berkeley.
BIOLOGY AND MEDICINE, ed. by John H. Lawrence. Semiannual rept., Spring 1962, on Contract W-7405-eng-48. June 62, 198p. 41 refs. NASA N62-(17427-17430)

NYO-2759 $3.50

New Jersey State Dept. of Health, West Orange.
THE EPIDEMIOLOGICAL FOLLOW-UP OF THE NEW JERSEY RADIUM DIAL PAINTERS. Progress rept. to 31 Jan 62 on Contract AT(30-1)-2181. Aug 62, 248p.

ORINS-41 $1.50

Oak Ridge Inst. of Nuclear Studies, Tenn.
MEDICAL DIVISION RESEARCH REPORT FOR 1961, on Contract AT(40-1)-GEN-33. [1962] 57p. 30 refs.

NYO-10152 $10.10

Sloan-Kettering Inst. for Cancer Research, New York.
BIOLOGICAL EFFECTS OF RADIATION, AND RELATED BIOCHEMICAL AND PHYSICAL STUDIES, by Frank L. Horsfall, Jr. Summary progress rept. 1 July 60-31 Oct 61, on Contract AT(30-1)-910. 31 Jan 62, 124p. 350 refs.

CHEMISTRY

OTS SB-506 $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
ORGANIC CATALYSTS. PART II: AROMATIC COMPOUNDS AND GENERAL CONCEPTS AND THEORY. Aug 62, 13p. 180 refs. OTS Selective Bibliography SB-506.

DESCRIPTORS: *Bibliography, Organic compounds, *Catalysts, Theory, Hydrogenation, Dehydrogenation, Desulfurization, Synthesis, Preparation, Hydrolysis, Reaction kinetics, Molecular association, Oxidation, Reduction, Dehydration, Halogenation, Nitriles, Purification, Condensation, Statistical analysis, Regeneration, Chemical bonus.

Lists 180 domestic and foreign references on organic catalysts added to the OTS collection during the period 1959 to August 1962. Includes reports on hydrogenation, dehydrogenation, synthesis and preparations, hydrolysis, kinetics, molecular rearrangements, demethylation, oxidation, reduction, dehydration, platforming, alkylation, halogenation, desulphurization, Friedel-Crafts reactions, nitriles, refining, aromatization, mechanisms, cyclization, condensation, alkoxylation, bond energy, structural and energetic factors, stereo-chemical studies, theory of reaction rates, statistical methods, electron bond, regeneration of catalysts and others. (Author)

Analytical Chemistry

TID-7015(suppl. 4) $3.75

Atomic Energy Commission. Div. of Technical Information Extension, Oak Ridge, Tenn.
OAK RIDGE NATIONAL LABORATORY MASTER ANALYTICAL MANUAL. June 62, 330p.

HW-SA-2635 $1.10

Hanford Atomic Products Operation, Richland, Wash.
APPLICATIONS OF CONTROLLED POTENTIAL COULOMETRY, by W. L. Delvin and L. R. Duncan. Rept. on Contract AT(45-1)-1350. 25 May 62, 8p. 3 refs.

LADC-5198 $1.60

Los Alamos Scientific Lab., N. Mex.
APPLICATIONS OF X-RAY ABSORPTION EDGE ANALYSIS, by E. A. Hakkila and G. R. Waterbury. 22 Aug 62, 17p. 12 refs.

DP-754 $0.50

Savannah River Lab., Aiken, S. C.
AUTOMATIC ANALYSIS OF MOIST HELIUM IN NUCLEAR REACTORS, by David L. West. Rept. on Contract AT(07-2)-1. Aug 62, 15p. 2 refs.

DP-751 $0.50

Savannah River Lab., Aiken, S. C.
NORMALIZING GAMMA SPECTRA FOR DATA PROCESSING, by Robert F. Overman. Rept. on Contract AT(07-2)-1. Aug 62, 9p. 12 refs.

Y-1398 $3.00

Union Carbide Nuclear Co., Oak Ridge, Tenn.
IONIC EQUILIBRIA AND ANION EXCHANGE OF URANYL SULFATE SOLUTIONS, by P. E. Stein. Rept. on Contract W-7405-eng-26. 6 June 62, 204p.

Physical Chemistry

IS-417 $2.50

Ames Lab., Iowa State U. of Science and Tech.
SOME THERMODYNAMIC PROPERTIES OF AQUEOUS RARE-EARTH CHLORIDE SOLUTIONS, by David Andrew Csejka and Frank H. Spedding. Rept. on Contract W7405-eng-82. Aug 61, 143p. 91 refs.

TID-11969 $1.10

Argonne National Lab., Ill.
FRACTIONATION OF GASEOUS URANIUM AND URANIUM MONOSULFIDE AT HEATED SURFACES, by E. David Cater and R. J. Thorn. Dec 60, 9p.

TID-16693 $5.60

Argonne National Lab., Ill.
THE COORDINATION CHEMISTRY OF 3d TRANSITION METAL IONS IN FUSED SALT SOLUTIONS, by Dieter M. Gruen and Robert L. McBeth. June 62, 56p. 48 refs.

ANL-6579 $1.25

Argonne National Lab., Ill.
SURFACE IONIZATION METHOD OF DETECTING HALOGEN-BEARING GASES, by Henry A. Schultz. Rept. on Contract W-31-109-eng-38. July 62, 50p. 7 refs. NASA N62-15529.

BM-RI-5812 $1.00

Bureau of Mines, Washington, D. C.
PROBLEMS IN RECOVERING THERMAL ENERGY FROM MOLTEN SALTS, by T. A. Henrie, R. A. Renner and others. 1961, 30p. 5 refs.

GA-2512 $1.00

General Atomic Div., General Dynamics Corp., San Diego, Calif.
THE HIGH-TEMPERATURE CHEMISTRY OF FISSION-PRODUCT ELEMENTS, by U. Merten, W. E. Bell, and J. D. Hale. Summary rept. for 1 Aug 60-31 July 61, on Contract AT(04-3)164. 29 Aug 61, 37p. 15 refs.

AD-263 276 $10.50

Institute of Polymer Research, Polytechnic Inst. of Brooklyn, N. Y.
PHOTOREDUCING DYE SYSTEMS, by Gerald Oster. Final rept. 1 Apr 58-31 Mar 61, on Project "Sun", Contract AF 19(604)3065. June 61, 137p. 78 refs.

DESCRIPTORS: *Dyes, Acridines, Anilines, Thiazines, *Photochemistry, Photochemical reactions, Reduction, Electric potential, Production, Measurement, Reagents, Ascorbic acid, Thiourea, Cysteine, Ethylenedinitro tetracetates, Amines, Ethanols, Solar energy.

Included in the report are:
Photoreduction of acridine dyes, pub. in the Jnl. of the

American Chemical Society 81: 1357-1363, 1959 Riboflavin as an electron donor in photochemical reactions, pub. in the Jnl. of the American Chemical Society 83:1865-1871, 1961

AD-279 561 $1.60

Noyes Chemical Lab., U. of Illinois, Urbana.
ELECTRON COUPLING OF PROTONS IN SiH_2 GROUPS AND IN H_2O, by J. C. Schug and H. S. Gutowsky. Technical rept. no. 45 on Contract Nonr-1834(13). 27 Oct 61, 11p. 23 refs.

DESCRIPTORS: *Silanes, Halogen compounds, *Water, *Chemical bonds, Atomic orbitals, Electrons, *Protons

The valence bond method for calculating spin-spin interactions has been used to obtain the σ-electron contribution to the proton-proton coupling constant in SiH_2 groups as a function of the bond angle, and in H_2O at a fixed bond angle of 105°. The calculations indicate that $A_{HH'}$ is negative in the halosilanes and positive in H_2O. The disagreement between calculated and experimental values is larger than has been observed so far in CH_2 systems; and some sort of substituent effect is indicated probably in the nature of a π-electron contribution. (Author)

AD-280 824 $3.60

Stanley-Thompson Lab., Columbia U., New York.
THE EFFECT OF DISSOLVED SPREADING SOLVENT ON MONOLAYER PRESSURE AND WATER EVAPORATION RESISTANCE, by I. R. Miller and L. Nanis. Rept. on Contract Nonr-266(64). 8 May 62, 39p. 17 refs.

DESCRIPTORS: *Thermodynamics, *Phase studies, *Thin films, Organic solvents, Water, Evaporation, Resistance, Diffusion, Vapors

The effect of spreading solvents and contaminants on the pressure and the evaporation retardation properties of spread monolayers is considered in terms of a thermodynamic equilibrium between a one molecule thick interface partly occupied by the spread monolayer and the adjacent layer in either the aqueous or vapor phases. The thermodynamic treatment permits the relation of penetrating solvent or contaminant concentration in the layers adjacent the monolayer to an associated surface concentration and increment in surface pressure. Analysis of literature data on the resistance of monolayers to evaporation suggests that penetrating solvents or contaminants reduce the resistance of the monolayer by breaking up the aggregates formed through cohesional forces in the pure monolayers.

EARTH SCIENCES

RME-4539(rev.) $0.75

Atomic Energy Commission. Div. of Raw Materials, Washington, D. C.
RECONNAISSANCE FOR URANIUM IN THE COPIAPO AREA, PROVINCE OF ATACAMA, CHILE, by William A. Bowes, Paul H. Knowles and others. June 62, 30p. 19 refs. (Prepared in cooperation with Instituto de Investigaciones Geologicas, Santiago (Chile)).

NASA N62-16401 $2.60

National Severe Storms Project, Kansas City, Mo.
SOME MEASURED CHARACTERISTICS OF SEVERE STORM TURBULENCE, by Roy Steiner and Richard H. Rhyne (Langley Research Center). July 62, 21p. 4 refs. NSSP rept. no. 10.

AD-280 159 $4.60

Army Transportation Board, Fort Eustis, Va.
ENVIRONMENTAL OPERATION. TOPO ANTARCTICA, 1962. May 62, 42p. Rept. no. TCB-61-066-EO.

DESCRIPTORS: *Antarctic regions, *Geological survey, Mapping, *Transportation, *Helicopters, Maintenance Logistics, Personnel, Survival.

TOPO ANTARCTICA was an aviation project in which a task detachment of the U. S. Army Transportation Board, using two HU-1B Iroquois helicopters, provided support for a large scale topographic mapping survey conducted by the U. S. Geological Survey and the National Science Foundation on the Antarctic Continent. Control points were established during the 1510 mile aerial traverse which will enable cartographers to accurately chart over 100,000 square miles of previously unmapped Antarctic terrain. (Author)

NASA N62-16380 $2.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
DISPERSION OF LONG-PERIOD LOVE WAVES IN A SPHERICAL EARTH, by Robert L. Kovach and Don L. Anderson. Rept. on Contract NAS7-100 and NASw-81. 30 Aug 62, 25p. 33 refs. Technical rept. no. 32-330; Prepared in cooperation with Seismological Lab., Calif. Inst. of Tech.

Oceanography

AD-279 941 $2.60

Fisheries Instrumentation Lab., Houghton, Wash.
RESEARCH IN MARINE SCIENCE IN CONNECTION WITH BUOY INSTRUMENTATION. Technical rept. 1 Apr 60-31 Mar 61, on Contract Nonr-34-60. [1961] 21p. 8 refs.

DESCRIPTORS: Scientific research, Marine biology, *Oceanography, *Instrumentation, *Buoys, Flowmeters, Depth indicators, Turbulence, Pressure, Recording devices, Telemeter systems, Fishes, Reaction time, Time interval counters, Markers, Salinometers, Airborne, Radiometers, Calibration, Aquatic animals, Pumps, Ultrasonic equipment, Generators, Crustacea, Counting methods.

Contents:
The "sphere"
The "egg"
Oceanographic telemetry
Fish-reaction timer
Coatings for radioactive sources
ONR conference on fleet instrumentation
Norwegian buoy investigation
Towed salinometer
Calibration of airborne radiometer

Plankton pump
Rectifier-pulser
Sonic fish tag
Shrimp counter
Plankton sampler

AD-280 324 $4.60

Marine Lab., U. of Miami, Coral Gables, Fla.
A PROGRAM FOR AUTOMATIC TEMPERATURE AND DEPTH CALCULATIONS ON THE IBM 650 COMPUTER, by Donald T. Eger. Rept. on Contract Nonr-840(01). Feb 62, 48p. 6 refs. Rept. no. 62-3; ML 62069.

DESCRIPTORS: *Oceanographical data, Temperature, Depth finding, Automatic, Processing, *Digital computers, Computers, *Programming, Water depth indicators, Depth indicators, Thermometers.

The first major step in processing oceanographic data is to determine the correct water temperature and the correct depth at which the observations were made. The various thermometer correction factors and the calculations required to determine the correct temperatures and depths have heretofore been applied to the original thermometer readings with the aid of a desk calculator or a special oceanographic slide rule. The following program is designed to perform automatically all of the functions necessary for rapid and accurate temperature, thermometric depth and wire angle depth calculations.

AD-266 307 $4.60

[Naval Oceanographic Office] Washington, D. C.
THE OCCURRENCE AND VELOCITY DISTRIBUTION OF SHORT-TERM INTERNAL TEMPERATURE VARIATIONS NEAR TEXAS TOWER NO. 4, by Roy D. Gaul. May 61, 46p. 15 refs. Technical rept. TR-107; ASWEPS rept. no. 1.

DESCRIPTORS: *Periodic variations, Underwater, *Ocean waves, Temperature, Velocity, Atlantic Ocean, Oceanographical data, Ocean currents, Temperature perception, Frequency.

This report describes a study of the occurrence, speed, and direction of short-term changes in water temperature near Texas Tower No. 4 off New York. Measurements made during two-week periods in the fall of 1959 and the spring of 1960 reveal common occurrences of internal solitary wave forms indicated by temperature changes at fixed levels of several degrees centigrade within several-minute intervals. Internal temperature wave forms observed in both seasons were typically moving onshore at speeds ranging from 0.75 to 1,30 knots. Comparison of observed speeds with values calculated from internal solitary wave theory exhibits reasonable agreement considering the limitations of the field experimental phase of the study. (Author)

AD-262 803 $19.75

Sedimentological Research Lab., Florida State U., Tallahassee.
THE HYDROGRAPHY OF APALACHICOLA AND FLORIDA BAYS, FLORIDA, by H. G. Goodell and D. S. Gorsline. Data rept. on Contract Nonr-988(07). Aug 61, 322p. Contribution no. 1.

DESCRIPTORS: *Hydrographic surveying, *Hydrology, Sedimentation, Geological survey, Harbors, *Ocean bottom, Oceanographical data, Collecting methods, Florida straits, Gulf of Mexico.

The study is to investigate and compare the hydrology and marine geology of the bays in order to show the effects of hydrology on sedimentation and the interrelationships between sedimentation and bottom morphology on the water motion and exchange within the bays. Florida and Apalachicola Bays were chosen because of their radically different sediments and sedimentary patterns. This report covers the hydrographic data collected during the first year's work. Since synoptic water data of this type are relatively rare, the investigators have reproduced the complete tabulated observations for those biologists, geologists, and hydrographers interested in shallow water oceanography.

AD-280 426 $2.60

Washington U., Seattle.
RECOVERY OF DRIFT BOTTLES RELEASED IN THE SOUTHEASTERN CHUKCHI SEA AND NORTHERN BERING SEA, by Richard H. Fleming and Diane Heggarty. Technical rept. no. 70 on Brown Bear Cruise 268, 26 July-28 Aug 60, Contracts AT-45-1-540 and Nonr-477(10). Feb 62, 22p. 13 refs. Ref. M62-7.

DESCRIPTORS: Oceanography, *Chukchi Sea, *Bering Sea, *Ocean currents, Oceanographical data.

During August 1960, a total of 1653 drift bottles was released in the northern Bering and southeastern Chukchi Seas. During October and November 1960, 200 additional releases were made. Prior to 1 December 1960 a total of 129 recoveries was reported from the releases made in August. During the summer and fall of 1961, 34 additional recoveries were reported, 33 from the summer stations and one from the fall releases. The recoveries confirm the general northward transport of water in the area. Virtually all recoveries along the Alaskan coast of bottles released in the Chukchi Sea were from stations located near the coast. During 1961 six recoveries were reported from the USSR, one from Wrangel Island and the others from the Siberian coast. (Author)

PB 162 350 $1.60

Woods Hole Oceanographic Institution, Mass.
BIBLIOGRAPHY OF REPORTS, 1961. Jan 62, 11p. 41 refs. Reference no. 61-41.

DESCRIPTORS: *Bibliography, Scientific reports, *Oceanography.

The reports are arranged chronologically with an author index.

ENGINEERING

SCDC-966 $2.60

Sandia Corp., Albuquerque, N. Mex.
RELIABILITY ENGINEERING: A NEW PROFESSION, by Bernard Ostle. [1961] 28p. 7 refs.

Chemical Engineering

TID-11461 $1.10

Los Alamos Scientific Lab., N. Mex.
LABORATORY COMPRESSED GASES, HANDLING AND STORAGE, by Ellis L. Stout. 8p. 6 refs. LADC-4508.

MCW-1475 $1.00

Mallinckrodt Chemical Works, Weldon Spring, Mo.
PROCESS DEVELOPMENT. Quarterly progress rept. Apr-June 62, on Contract W-14-108-eng-8. 1 Aug 62, 49p. 17 refs.

Civil Engineering

PB 181 450 $5.00

Bureau of Yards and Docks., Washington, D. C.
CARPENTRY HANDBOOK. Engineered Performance Standards, Public Works Maintenance. Sep 62, 342p. NAVDOCKS P-702.0, supersedes NAVDOCKS P-702.

DESCRIPTORS: Handbooks, *Operations research, Standards, *Construction, Time, Motion, Floors, Structures, Furniture, Milling machines, Roofs.

PB 181 460 $2.75

Bureau of Yards and Docks, Washington, D. C.
PIPEFITTING PLUMBING HANDBOOK. Engineered Performance Standards, Public Works Maintenance. Dec 62, 129p. NAVDOCKS P-711.0, supersedes NAVDOCKS P-711 of July 59, rev. 1 May 61.

DESCRIPTORS: Handbooks, *Plumbing, *Maintenance personnel, Time, Motion, Standards, *Pipe fittings, Pipes, Plumbing fixtures, Latrines, Water supplies, Heaters, Operations research.

Contents:
Devices-dirt or drip pockets, traps, and strainers; remove, clean, and reinstall
Devices-expansion and slip joints; install, remove, repack, and reinstall
Devices-regulators and valves; clean, adjust, and repack
Devices-regulators and valves: install, remove, and reinstall
Heating equipment-radiators, unit heaters, and tanks; install, clean, service, and remove
Hydrants-fire; replace, service, and test
Insulation-pipe and fittings; install
Insulation-pipe and fittings; remove
Miscellaneous
Pipe-bell and spigot; water or sewer; install and remove
Pipe-clay or concrete; install and remove
Pipe-iron or steel; cut, ream, and thread
Pipe-iron, steel, or brass; flanged joints; install, remove, and reinstall
Pipe and fittings-threaded; iron, steel, or brass; install, remove, and reinstall
Pipe-tubing (copper); cut, ream, flare, and install
Pipe-tubing (copper); cut, ream, install, and solder
Plumbing fixtures-basins and showers; install, remove, and reinstall
Plumbing fixtures-toilets and urinals; install, remove, and reinstall

PB 181 461 $1.00

Bureau of Yards and Docks, Washington, D. C.
WHARFBUILDING FORMULAS. Engineered Performance Standards, Public Works Maintenance. Jan 63, 31p. NAVDOCKS P-715.1, supersedes rept. dated Feb 61, PB 181 063.

DESCRIPTORS: *Piers, Construction, Standards, Marine engineering, Harbors, Floating docks, Naval shore establishments, Tools, *Maintenance equipment, Maintenance tools, *Machine tools, Military requirements, Engineering.

Contents:
Pile driving operations
Floating crane operations
Wharfbuilding tools and related equipment
Protective caps for timber piles
Move waterborne heavy equipment and material
Move skidrigged pile driver on work site

Electrical and Electronic Engineering

PB 162 556 $10.50

Army Signal Radio Propagation Agency, Fort Monmouth, N. J.
ANALYSIS AND PREDICTION OF SKY-WAVE FIELD INTENSITIES IN THE HIGH FREQUENCY BAND, by Paul O. Laitinen and George W. Haydon. Revised Oct 62, 132p. 16 refs. Technical rept. no. 9; RPU-203; AD-210 022.

DESCRIPTORS: Handbooks, *Wave transmission, High frequency, *Radio communication systems, Analysis, *Ionospheric propagation, Absorption, *Solar disturbances, Terrestrial magnetism, Periodic variations, Radio receivers, Circuits, Statistical analysis, Nomograms, Tables.

The purpose of this report is to present an engineering method of evaluating sky-wave field intensities in the high frequency band for any transmission distance up to about 15,000 kilometers. Field intensity recordings were statistically analyzed in order to study daytime absorption, day-to-day variations, and absolute magnitudes. Based upon the analysis, a proposed prediction method was obtained which should give relatively accurate sky-wave field intensities for the frequencies and distances considered. Succeeding sections show the method of analysis of absorption, the method of analysis of absolute magnitudes, the method of analysis of day-to-day variations, the proposed field intensity prediction method, and summarizing conclusions. All necessary equations used in the prediction method are represented in nomograms.

AD-267 630 $1.10

Computation Center, Mass. Inst. of Tech., Cambridge
REAL-TIME, TIME-SHARED COMPUTER PROJECT, by Philip M. Morse and Herbert M. Teager. Quarterly progress rept. no. 4 on Contract Nonr-1841(69). 31 Oct 61, 8p. DSR #8644.

DESCRIPTORS: *Computers, *Programming, Mathematical computer data, Design, Construction, Operation, Training, Memory devices, Scientific research.

Three remote consoles, complete with a digital plotter (for graphical output), typewriter, and a graphical hand-drawn input device are being constructed. To control the plotters, a special-purpose computer is being built. Of these three units, only the hand-drawn input device is still in prototype design and construction stage.

PB 162 378 $1.60

High-Energy Physics Lab., Stanford U., Calif.
INVESTIGATION OF THE Q OF A SUPERCONDUCTING MICROWAVE CAVITY, by Perry B. Wilson. [Rept. on Contract N6onr-251(16)]. [1962] 12p. 3 refs. Rept. no. HEPL-262.

DESCRIPTORS: *Superconductors, Microwaves, *Cavity resonators, Radiofrequency, Electrical properties, Resistance, Superconductivity.

An experimental program has been started at Stanford in an effort to clarify some problems concerning the rf behavior of superconductors. The first step in this program has been to measure the Q of a superconducting microwave cavity, both for tin and lead surfaces, with particular attention being paid to cavity behavior at high input power levels. The results obtained to date are presented. (Author)

AD-267 651 $5.60

Naval Boiler and Turbine Lab., Philadelphia, Pa.
EVALUATION OF AUTOMATIC FILLING AND BLOWDOWN SYSTEM FOR CVA63 AND 64 CATAPULT RECEIVER AT NBTL, by J. A. Grassi and R. E. Kaufman. 18 July 61, 53p. 4 refs. Evaluation rept., NBTL Proj. T-316.

DESCRIPTORS: *Aircraft carriers, Catapults, Boilers, Valves, *Gas valves, *Pneumatic valves, *Control valves, Shipborne, Control, Tests, Shock resistance, Vibration.

The CVA-63 and 64 catapult receiver fill and blowdown system in its NBTL full scale set-up was evaluated in terms of its separate components and as an integral system. The complete system under automatic control demonstrated the flow capability of filling the receiver from 720 to 1000 psi in 22 seconds, although there was a lag of about two seconds plus between set point time and valve opening time. Receiver pressure control up to full range of 1000 psig was demonstrated satisfactorily with the 8" fill valve but not with the 6" blowdown valve. The Taylor automatic controls did not pass shock and vibration tests. The Moore system did. A skillful operator with the manual controls can approach the efficacy of the automatic control but the automatic operation is considered the more desirable because of ease of operation, more sustained high level performance, less wear on moving parts, greater economy of steam and time. (Author)

OTS SB-499 $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
SERVOMECHANISMS AND CONTROL SYSTEMS. Aug 62, 21p. 364 refs. OTS Selective Bibliography SB-499.

DESCRIPTORS: *Bibliography, *Servomechanisms, *Control systems, Remote control systems, Synchros, Automatic pilots, Computers.

This bibliography lists 364 reports and translations on servomechanisms, servo systems, control systems, automatic pilots and synchros. Computer control, with a few exceptions, is not included since it is covered in another bibliography. The reports include design, construction and applications of the various control systems. (Author)

SCTM-81-59(51) $2.60

Sandia Corp., Albuquerque, N. Mex.
THE RECTIVERTER, by H. H. Sander. 10 Mar 59, declassified. 22p.

AD-280 226 $2.60

Systems Research Center, Case Inst. of Tech., Cleveland, Ohio.
DYNAMIC STATISTICAL LINEARIZATION, by Mihajlo Mesarović and Walter J. Culver. Rept. on Contracts Nonr-1141(09) and Nonr-1141(12). 1 Jan 62, 28p. 12 refs. Rept. no. SRC 6-A-62-6.

DESCRIPTORS: *Nonlinear systems, *Control systems, Synthesis, Dynamics, Digital computers, Computers, Data storage systems, *Statistical processes, Mathematical prediction, Operators (Mathematics), *Linear system.

The new concept of dynamic statistical linearization is presented as an orderly approach to the linearization of dynamic nonlinear systems. The method is approached from a statistical viewpoint with implications for its use in on-line computer control. Necessary and sufficient conditions which specify the optimal equivalent linear system are developed for several different classes of problems of practical significance. (Author)

Ordnance, Missiles, and Satellite Vehicles

NASA N62-16412 $10.10

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
ACCURATE DRAG DETERMINATIONS FOR EIGHT ARTIFICIAL SATELLITES: ATMOSPHERIC DENSITIES AND TEMPERATURES, by Luigi G. Jacchia and Jack Slowey. Rept. on Research in Space Science, Grant NsG-87-60. 30 July 62, 123p. 23 refs. SAO Special rept. no. 100.

NASA N62-16381 $8.10

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE RANGER 4 FLIGHT PATH AND ITS DETERMINATION FROM TRACKING DATA, by T. W. Hamilton, W. L. Sjogren and others. Rept. on Contract NAS7-100. 15 Sep 62, 89p. 11 refs. Technical rept. no. 32-245.

NASA N62-16372 $5.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SPACE PROGRAMS SUMMARY NO. 37-15, VOLUME III. DEEP SPACE INSTRUMENTATION FACILITY. Rept. for 1 Mar-1 May 62, on Contract NAS7-100. 31 May 62, 56p. 2 refs. JPL SPS-37-15, Vol. III.

NASA N62-10837 $2.60

Rochester U. Coll. of Engineering, N. Y.
NASA SPACE ENVIRONMENT TEST CHAMBER AND SOLAR RADIATION SIMULATOR. Preliminary rept. on Contract NASw-81. Nov 60, 27p.

Sanitation and Safety Engineering

BNL-5248 $1.60

Brookhaven National Lab., Upton, N. Y.
THE CONCENTRATIONS AND RESIDENCE TIMES OF POLLUTANTS IN THE ATMOSPHERE, by Maynard E. Smith. 1 Jan 61, 16p. 7 refs.

SC-4689(RR) $1.25

Sandia Corp., Albuquerque, N. Mex.
A RISK-ORIENTED APPROACH TO PROTECTION FROM NUCLEAR WEAPONS, by L. J. Vortman. Sep 62, 52p. 18 refs.

FOOD, HANDLING, AND PACKAGING EQUIPMENT

NYO-9576 $3.60

Massachusetts Inst. of Tech., Cambridge.
A STUDY OF THE EFFECTS OF SUB-STERILIZATION DOSES OF RADIATION ON THE STORAGE LIFE EXTENSION OF SOFT-SHELLED CLAMS AND HADDOCK FILLETS, by John T. R. Nickerson, Samuel A. Goldblith, and Edmund B. Masurovsky. Quarterly progress rept. May-July 62, on Contract AT(30-1)-3006. [1962] 35p. 60 refs.

MACHINERY, FABRICATION, AND ACCESSORY EQUIPMENT

NASA N62-16376 $3.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A METHOD FOR THE DETERMINATION OF LOCAL TRANSIENT HEAT FLUX IN UNCOOLED ROCKET MOTORS, by Walter B. Powell, Glen W. Howell, and James P. Irving. Rept. on Contract NAS7-100. 1 July 62, 31p. 10 refs. Technical rept. no. 32-257; supersedes memo no. 20-154.

Transport, Traction and Hoist Facilities

BNL-6238 $4.60

Brookhaven National Lab., Upton, N. Y.
THE MAGNETIC ROAD: A NEW FORM OF TRANSPORT, by James R. Powell. 10 Sep 62, 43p. 10 refs.

PB 181 459 $1.50

Bureau of Yards and Docks, Washington, D. C.
MOVING RIGGING HANDBOOK. Engineered Performance Standards, Public Works Maintenance. Dec 62, 52p. NAVDOCKS P-709.0 supersedes NAVDOCKS P-709 of Oct 59, rev. 1 Mar 61.

DESCRIPTORS: Handbooks, *Hoists, Mobile, *Maintenance, personnel, Time, Motion, Standards, *Marine engineering, Ships, Operations research.

Contents:
Crane operations
Fenders, tugboat - install or remove
Furniture moving
Marine rigging - material and equipment
Marine rigging - transportation equipment
Reeving
Scaffolding
Shop operations
Weight capacity testing

HW-SA-2514 $1.60

Hanford Atomic Products Operation, Richland, Wash.
SHIPMENT OF GROSS QUANTITIES OF RADIOSTRONTIUM, by L. L. Zahn, C. W. Smith and others. Rept. on Contract AT(45-1)-1350. 5 Sep 62, 15p. 3 refs.

MATERIALS

HW-66977 $1.60

Hanford Atomic Products Operation, Richland, Wash.
ELASTOMERS FOR USE IN RADIATION FIELDS. XIV. EFFECT OF CARBON BLACK AND OTHER FILLERS ON A NITRILE ELASTOMER, by Robert Harrington. 1 Mar 61, 21p.

ORO-487 $0.50

Isotope Development Lab., Research Triangle Inst., Durham, N. C.
THE USE OF BACKSCATTERED GAMMA RAYS FOR EVALUATING DEFECTS IN LOGS AND TREES, by Ralph L. Ely, Jr. and Wesley E. Loos. Final rept. on Contract AT(40-1)-2513. 31 July 62, 30p. 16 refs. RTI-2513-T1.

OTS SB-502 $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
CONCRETE AND CEMENTS. July 62, 26p. 482 refs. OTS Selective Bibliography SB-502.

DESCRIPTORS: *Bibliography, *Concrete, Reinforced concrete, *Cements, Materials.

Lists 482 reports and translations added to the OTS collection during the period 1940 to July 1962. Covers research on light weight aggregates, cellular and air entrained concrete, precast and prestressed concrete, glass-fiber reinforced, steel-reinforced, soil cement mixtures, concrete pavements, concrete for nuclear radiation shielding, fire and heat resistance tests, and nondestructive testing among other subjects. (Author)

Ceramics and Refractories

GEMP-15A $1.75

General Electric Co., Cincinnati, Ohio.
HIGH TEMPERATURE MATERIALS PROGRAM. Progress rept. no. 15, part A, on Contract AT(40-1)-2847. 14 Sep 62, 71p. 14 refs. NASA N62-15948.

UCRL-6262(Pt. 2) $2.00

Lawrence Radiation Lab., U. of California, Livermore.
PHYSICAL PROPERTIES AND PHASE DIAGRAMS OF TEN REFRACTORY OXIDES: PART 2, JOURNAL LITERATURE: SELECTED BIBLIOGRAPHY, by Zanier D. Lane, Mary Jane Tunis and others. Rept. on Contract W-7405-eng-48. July 62, 87p. 759 refs. NASA N62-16418.

TID-12751 $1.60

Los Alamos Scientific Lab., N. Mex.
HIGH TEMPERATURE POISONS, by J. M. Leitnaker, N. H. Krikorian, and M. G. Bowman. 18p. 31 refs. LADC-4676.

OTS SB-503 $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
CERAMICS (SUPPLEMENT TO CTR-373). Aug 62, 26p. 532 refs. OTS Selective Bibliography SB-503.

DESCRIPTORS: *Bibliography, *Ceramic materials, Refractory materials, Materials.

Lists 532 foreign and domestic reports added to the OTS collection during the period 1959 to August 1962. Covers research on refractory materials for high temperature use, protective coatings for refractory metals, erosion resistant coatings for engines, metal fiber reinforced ceramics, metal-ceramic composites, metal-to-ceramic seal technology, ceramic roller bearings, microminiature ceramic capacitors, casting ceramic materials, and ceramic cutting tools among other subjects. (Author)

OTS SB-504 $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
CERMETS. Aug 62, 10p. 170 refs. OTS Selective Bibliography SB-504.

DESCRIPTORS: *Bibliography, *Cermets, Ceramic materials, Materials.

Lists 170 reports and translations on cermets added to the OTS collection during the period 1945 to August 1962. Covers research on manufacture of metal-ceramic combinations, casting cermets, semiconducting ceramic material, high temperature cermets for machine parts, impact testing, ceramic-fiber base cermets, silicide cermets among other subjects. (Author)

Leather and Textiles

PB 181 456 $2.50

Quartermaster Research and Engineering Command, Natick, Mass.
CHEMICAL MODIFICATION OF FEATHER FILLING MATERIALS WITH WERNER TYPE CHROMIUM COMPLEXES, by George Cohen and Josephine M. Stephens. July 61, 101p. 12 refs. Textile Engineering Lab. rept. no. 284.

DESCRIPTORS: *Feathers, Processing, Moisture-proofing, *Complex compounds, *Chromium compounds, Test methods, Cleaning, Manufacturing methods, *Sleeping bags, Standards.

A treatment for feathers has been developed which is applicable to both chicken and waterfowl feathers. This treatment improves the filling power of the feathers when compared to untreated waterfowl feathers, both before and after laundering. The treatment involves the use of a tanning agent to improve the filling power and a water repellent to improve laundering durability. Feathers treated by this process, in addition to increased filling power and water repellency, are exceptionally clean and will not develop an odor, even when wet. Mixtures containing 40% of treated chicken feathers and 60% of the standard 40/60 waterfowl down and feather mixture have been evaluated in field tests as a filler for sleeping bags, and have been found to be at least equal to, and in some cases superior to, the standard 40/60 waterfowl mixture.

PB 181 455 $0.50

Quartermaster Research and Engineering Command, Natick, Mass.
THE TAN-O-QUIL-QM PROCESS FOR THE CHEMICAL MODIFICATION OF FEATHERS, by George Cohen and Josephine M. Stephens. Sep 60, 17p. Textile Engineering Lab. rept no. 273.

A paper presented at a meeting of the QMC Industry Advisory Committee on Feathers and Down, held at Fort Jay, Governor's Island, New York City, on September 8, 1960.

DESCRIPTORS: *Feathers, Processing, Moisture-proofing, *Chromium compounds, Sulfates, *Sleeping bags, Tests.

A treatment for feathers has been developed which is applicable to both landfowl and waterfowl feathers. It involves the use of a tanning agent to improve the filling power and a water repellent to improve laundering durability. Feathers treated by this process in addition to increased filling power and water repellency, are exceptionally clean and will not develop an odor even when wet. Mixtures containing 40% of treated feathers, chicken or waterfowl, and 60% of the standard waterfowl mixture are a definite improvement over the standard 40/60 waterfowl mixture. Mixtures of 40% of treated chicken feathers and 60% of the standard 40/60 waterfowl mixture have been evaluated in field tests as a filler for sleeping bags and found to be at least equal to and in some cases superior to the standard 40/60 waterfowl mixture.

MATHEMATICS

HW-SA-2056 $1.10

Hanford Atomic Products Operation, Richland, Wash.
LOLA: A MULTI-DIMENSIONAL OPTIMIZATION CODE FOR THE IBM 709-7090, by M. R. Egan. 18 Aug 60, 4p. 2 refs.

NASA N62-16378 $1.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
LINEAR ESTIMATION APPLIED TO THE NUMERICAL SOLUTION OF DIFFERENTIAL EQUATIONS, by W. Kizner. Rept. on Contract NAS7-100. 5 Aug 62, 14p. 8 refs. Technical rept. 32-313.

UCRL-6260 $1.60

Lawrence Radiation Lab., U. of California, Berkeley.
THE SOLUTION OF THE SIMPLEST CENTERED DIFFERENCE APPROXIMATION TO POISSON'S DIFFERENTIAL EQUATION FOR A RECTANGULAR GRID OF EQUALLY SPACED POINTS, by Richard E. von Holdt. Rept. on Contract W-7405-eng-48. 22 Dec 60, 17p.

NASA N62-16379 $4.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
AN APPROXIMATE ANALYSIS OF A THIN-SPHERICAL SHELL LOADED AS A CANTILEVER BEAM, by H. E. Williams. Rept. on Contract NAS7-100. 13 Aug 62, 44p. 4 refs. Technical rept. no. 32-318.

NASA N62-16371 $2.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
VIBRATION OF THIN CIRCULAR RINGS. PART I. SOLUTIONS FOR MODAL CHARACTERISTICS AND FORCED EXCITATION, by T. E. Lang. Rept. on Contract NAS7-100. 1 July 62, 27p. 6 refs. Technical rept. no. 32-261.

Aerodynamics and Pneumatics

AD-280 028 $8.10

Aerophysics Lab., Mass. Inst. of Tech. [Cambridge].
SMALL DISTURBANCES IN NON-EQUILIBRIUM FLOW, by James Patrick Moran. Rept. on Contract AF 33(600)39852. Nov 61, 86p. 11 refs. Technical rept. 468; DSR 8500; NASA N62-11250.

DESCRIPTORS: *Aerodynamics, Gas flow, *Transonic flow, *Hypersonic flow, Aerodynamic configurations, Blunt bodies, Enthalpy, Relaxation time, Thermodynamics, Perturbation theory, Equations of motion, Taylor's series, Series.

Aerodynamic equations are developed which include effects of a single non-equilibrium process. All other relaxing phenomena which might occur simultaneously are assumed to be either frozen or in equilibrium. Small perturbation assumptions are applied to these flow equations which yield the transonic and hypersonic slender body equations for non-equilibrium flow. A similarity analysis is applied to these two slender body equations and from this the transonic and hypersonic similarity parameters are obtained. Subsonic and supersonic similarity parameters are also obtained by considering these flow regimes as a special case of the more general transonic form. (Author)

NASA N62-16310 $8.10

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
NORMAL SHOCK WAVES IN AIR: EQUILIBRIUM COMPOSITION AND FLOW PARAMETERS FOR VELOCITIES FROM 26,000 TO 50,000 FT/SEC, by Paul V. Marrone. Rept. on Contract NASr-119. Aug 62, 90p. 10 refs. CAL AG-1729-A-2.

NASA N62-16377 $4.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE FLUCTUATING PRESSURE FIELD IN A SUPERSONIC TURBULENT BOUNDARY LAYER, by A. L. Kistler and W. S. Chen. Rept. on Contract NAS7-100. 15 Aug 62, 44p. 14 refs. Technical rept. no. 32-277.

NASA N62-16382 $2.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SIMPLIFIED FREE-FLIGHT TESTING IN A CONVENTIONAL WIND TUNNEL, by Bain Dayman, Jr. Rept. on Contract NAS7-100. 1 Oct 62, 27p. 7 refs. Technical rept. no. 32-346.

AD-271 467 $2.60

Naval Weapons Lab., Dahlgren, Va.
SINGULARITIES IN SUPERSONIC FLOWS PAST BODIES OF REVOLUTION, by E. W. Schwiderski. Feb 62, 26p. 15 refs. NWL rept. no. 1792; NASA N62-11837.

DESCRIPTORS: *Bodies of revolution, *Supersonic flow, Axially symmetric flow, Shock waves, Gases, Boundary layer, Subsonic flow, Partial differential equations.

An investigation of the quasi-linear purely or non-purely supersonic flow past an axisymmetric body of finite dimensions leads to a significant limiting characteristic, which bounds the so-called transonic flow which depends on the shape of the shock wave in front of the body. An interesting asymptotic representation of the flow in the zero-angular region between the shock wave and the limiting characteristic reveals the limiting characteristic as a carrier of square root singularities in the derivatives of the flow quantities. (Author)

METALLURGY

ANL-6594 $0.75

Argonne National Lab., Ill.
THE SPECIFIC HEAT OF DYSPROSIUM METAL BETWEEN 0.4° AND 4°K, by Raymond Adolph Guenther. Master's Thesis. Rept. on Contract W-31-109-eng-38. Aug 62, 30p. 27 refs. NASA N62-16584.

BNL-6263 $1.10

Brookhaven National Lab., Upton, N. Y.
MEASUREMENTS OF THE VIBRATIONAL FREQUENCY SPECTRUM OF NICKEL-PALLADIUM ALLOYS, by Bernard Mozer and Kare Otnes. 4 Sep 62, 10p. 7 refs.

HW-74024 $0.50

Hanford Atomic Products Operation, Richland, Wash.
LATTICE CONSTANTS AND PHASE RELATIONS OF ARC MELTED PLUTONIUM-CARBON ALLOYS, by T. D. Chikalla. Rept. on Contract AT(45-1)-1350. May 62, 20p. 9 refs.

NASA N62-16477 $9.60

Lockheed Nuclear Products, Marietta, Ga.
EFFECT OF NUCLEAR RADIATION ON MATERIALS AT CRYOGENIC TEMPERATURES, by C. A. Schwanbeck. Quarterly progress rept. no. 6, Oct 61-June 62, on Contract NASw-114. [1962] 112p. ER-5848; NP-12004.

LAMS-2736 $0.50

Los Alamos Scientific Lab., N. Mex.
THE APPLICATION OF ULTRA-FINE PARTICLES IN TUNGSTEN POWDER METALLURGY, by P. R. Mundinger, H. H. Hausner, and W. H. Lenz. Rept. on Contract W-7405-eng-36. July 62, 13p. NASA N62-16506.

NMI-TJ-40(rev.) $2.60

Nuclear Metals, Inc., Concord, Mass.
IMPURITY EFFECTS IN COMMERCIALLY PURE BERYLLIUM PREPARED FROM POWDER, by A. K. Wolff, S. H. Gelles, and L. R. Aronin. Rept. on Contract AT(30-1)-1565. 3 Aug 62, 25p. 14 refs.

ORNL-3339 $2.60

Oak Ridge National Lab., Tenn.
DIFFUSION OF Zr^{95} IN BODY-CENTERED CUBIC IODIDE ZIRCONIUM, by T. S. Lundy and J. I. Federer. Rept. on Contract W-7405-eng-26. 5 Sep 62, 26p. 21 refs. NASA N62-15310

Ferrous Metals

AD-280 053 $2.60

Pennsylvania U. School of Metallurgical Engineering, Philadelphia.
TEMPERATURE DEPENDENCE OF THE YIELD POINTS IN IRON, by R. A. Ekvall and Norman Brown. Technical rept. on Contract Nonr-551(20). 16 Feb 62, 27p. 8 refs.

DESCRIPTORS: *Iron, Elasticity, Temperature, *Extensometers, Stresses, Hardening, Impurities

Between 300 and 90°K the elastic limit and the anelastic limit were measured in polycrystalline irons with .0014 and .012% interstitial impurities using a high sensitivity extensometer. The elastic limit was independent of temperature but depended on purity. The anelastic limit depended on temperature and impurity content, but the decrease in temperature dependence with decreasing amount of impurity indicated that an ultra-pure iron should show no temperature dependence of the anelastic limit as measured with a high sensitivity extensometer. These results do not support the existence of a temperature dependent Peierls-Nabarro Force in iron. The large temperature dependence ordinarily associated with the macroscopic measurements of the yield point was shown to be associated with the rate of work hardening in the microstrain region i.e. between our anelastic limit and the macroscopic yield point. The rate of work hardening in the microstrain region increases markedly with decreasing temperature. It was concluded that only thermally activated cross-slip would determine the temperature dependence of the macroscopic yield point if impurities could be completely eliminated. (Author)

PB 161 864 $1.25

Watertown Arsenal Labs., Mass.
IMPACT TESTING NO. 1. CALIBRATION OF THE CHARPY IMPACT MACHINE AND PROCEDURE FOR INSPECTION AND TESTING OF CHARPY V-NOTCH IMPACT SPECIMENS, by D. E. Driscoll. Nov 58, 44p. Rept. no. WAL 112/89 (Rev.), Supersedes report dated 1 May 52.

DESCRIPTORS: *Impact shock, *Test equipment, Calibration, Steel, Mechanical properties, Test methods.

The purpose of this document is to explain the Charpy V-notch impact test. The purpose and theory of the test, the design of both test machine and specimen, calibration of the machine, how to conduct the test, and the variables which affect results are described. Also included is the procedure to be followed by those wishing to have their machines certified as acceptable for Ordnance Corps inspection testing.

Nonferrous (except light) Metals

AD-275 118 $3.60

Armour Research Foundation, Chicago, Ill.
THE EFFECT OF A DISPERSE PHASE ON THE DUCTILE-BRITTLE TRANSITION OF BODY-CENTERED CUBIC METALS, by P. R. V. Evans. Rept. for 1 May 59-31 May 61, on Mechanisms of Ductility and Fracture, Contract AF 33(616)6506. Mar 62, 34p. 25 refs. ARF-2975-6; ARL 62-301.

DESCRIPTORS: Metals, Electron beams, Melting, *Niobium, *Nitrogen, Diffusion, Grains (Metallurgy), Crystals, Crystal structure, Tensile properties, Deformation, Dispersion hardening, Stresses, *Phase studies, Chemical analysis, Metallurgical analysis, Nitrides.

The tensile properties of electron-beam melted columbium and a series of columbium-nitrogen alloys containing up to 0.036w/o nitrogen have been examined at room temperature over a range of grain sizes. The variation of lower yield stress σ_{LY} with grain-size d has been used to determine the values of σ_o and k in a Petch type equation $\sigma_{LY} = \sigma_o + kd^{-1/2}$. Whereas k was not influenced by nitrogen content and was, with one exception, immeasurably small, σ_o was particularly sensitive to nitrogen content. Some dispersion-hardened structures (Cb_2N as dispersed phase) were studied and, employing the Petch equation, a quantitative measure of the contribution of the dispersion to yield strength was made. A measure of the Peierls-Nabarro force for the columbium lattice at room temperature was obtained. (Author)

PB 158 192 $3.60

[Space Sciences] Lab., General Electric Co., Philadelphia, Pa.
DISPERSION STRENGTHENED COPPER-THORIUM BROMIDE AND COPPER ALUMINA ALLOYS PRODUCED BY MELTING AND CASTING, by Gilbert J. London. Rept. on Contract AF 04(647)269. 6 Aug 59, 38p. 13 refs. Technical Information series R59SD407.

DESCRIPTORS: *Copper alloys, Production, *Thorium compounds, Bromides, Aluminum compounds, Oxides, Melting, Casting, *Dispersion hardening, Microstructure, Tensile properties.

This report describes work on producing dispersion strengthened copper alloys using melting and casting techniques as opposed to more conventionally used powder metallurgy techniques. Two methods of approach are described. One method produces copper-thorium boride alloys by liquid phase precipitation. Cu-2% ThB_4 alloys produced by this technique show 10 to 80% improved tensile properties, two-to-three orders of magnitude improved creep and stress-rupture properties together with a 2 to 10% increase in electrical resistivity. The second method produces a copper-aluminum oxide alloy by a solid state diffusion reaction following melting and casting. The precipitate formed is extremely fine, resisting recrystallization at 1000°C for 24 hours. (Author)

Structural Metallurgy and Corrosion

ARF-2181-12 $2.00

Armour Research Foundation, Chicago, Ill.
THE MECHANISM OF STRESS CORROSION IN STAINLESS STEELS. Final rept. 15 May 59-15 May 60, on Contract AT(11-1)-Gen-14. Sep 62. 78p.

WAPD-TM-307 $1.00

Bettis Atomic Power Lab., Pittsburgh, Pa.
THE EFFECT OF LITHIUM HYDROXIDE AND RELATED SOLUTIONS ON THE CORROSION RATE OF ZIRCALOY IN 680 F WATER, by E. Hillner and J. N. Chirigos. Rept. on Contract AT(11-1)-GEN-14. Aug 62, 42p. 17 refs.

PB 153 810 $3.60

Illinois U., Urbana.
EFFECT OF COPPER ON THE CORROSION OF HIGH-PURITY ALUMINUM IN HYDROCHLORIC ACID, by M. Metzger, G. R. Ramagopal, and O. P. Arora. Technical rept. no. 3 on Contract Nonr-1834(25). 24 Mar 60, 40p. 19 refs. AD-235 190.

DESCRIPTORS: *Aluminum, Corrosion, Hydrochloric acid, *Copper, Aluminum alloys, Iron alloys, Silicon alloys, Hydrochloric acid.

The effects of Cu (0.0001 to 0.06%) on the general corrosion of coarse-grained single-phase high-purity Al in HCl(1 to 26%) were investigated. Quantitative determinations were made of the loss of Al by measuring the volume of H evolved in the autocatalytic reaction. The H was equivalent to a quantity of trivalent Al varying from 83 to 98% of the weight loss measured directly, so that the H volume was a satisfactory measure of corrosion. Three states of corrosion were observed, (1) an initial slow stage, (2) a macroscopically uniform corrosion at a constant rate which varied little if any with Cu, and (3), when observed, an accelerated corrosion localized in pits and trenches as a result of catalysis by low H-overvoltage cathodes from the Cu in

the corrosion product. The catalyzed rate was proportional to the total corrosion with a rate constant increasing 3 orders of magnitude for a 30-fold Cu increase. The delay time for the inception of the autocatalytic reaction decreased with increased Cu and with increased acid strength. Increasing Cu from 0.002 to 0.06% caused a cathodic shift in corrosion potential of about 100 mv in 16% HCl without changing the intrinsic corrosion rate.

SCDR-170-62 $1.10

Sandia Corp., Albuquerque, N. Mex.
ADDITIONAL DATA ON STRUCTURAL AND ENERGY-ABSORPTION PROPERTIES OF STAINLESS-STEEL HONEYCOMB CORE, by R. W. Weaver. Aug 62, 8p. (Supplement to SCDR 25-61 and SCTM-21-60-81).

DP-779 $0.50

Savannah River Lab., Aiken, S. C.
STRESS-CORROSION CRACKING OF 17-4 PH STAINLESS STEEL, by Raymond P. Jackson. Rept. on Contract AT(07-2)-1. Sep 62, 9p.

GEAP-3779 $1.00

Vallecitos Atomic Lab., General Electric Co., Pleasanton, Calif.
CORROSION OF TYPE 304 STAINLESS STEEL IN SIMULATED SUPERHEAT REACTOR ENVIRONMENTS, by G. G. Gaul and W. L. Pearl. Rept. on Contract AT(04-3)-189. 16 Oct 61, 37p. 7 refs.

NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

ANL-6556 $2.00

Argonne National Lab., Ill.
MATHEMATICAL FORMULATION, ANALYSIS, AND DESCRIPTION OF THE FRICKE DIFFUSION KINETICS CODE, by Erwin H. Bareiss, Cynthia Chamot, and Hugo Fricke. Rept. on Contract W-31-109-eng-38. May 62, 85p. 6 refs. NASA N62-16430.

ARF-1166-22 $2.00

Armour Research Foundation, Chicago, Ill.
STUDIES OF NUCLEAR RESONANT ABSORPTION OF GAMMA RAYS, by J. J. Ezop. Final rept. on Contract AT(11-1)-578. 1 May 62, 93p. 138 refs. NASA N62-16231.

WAPD-TM-334 $0.50

Bettis Atomic Power Lab., Pittsburgh, Pa.
CINDER. A ONE-POINT DEPLETION AND FISSION PRODUCT PROGRAM, by T. R. England. Rept. on Contract AT(11-1)-GEN-14. Aug 62, 26p. 3 refs.

BNL-5084 • $1.10

Brookhaven National Lab., Upton, N. Y.
A REMARK ON THE MEASUREMENT OF THE ANOMALOUS MAGNETIC MOMENT FORM FACTOR OF THE PROTON AT LARGE MOMENTUM TRANSFERS, by Loyal Durand, III. 18 Nov 60, 5p. 8 refs.

AD-279 289 $1.10

[Gates and Crellin Labs. of Chemistry] Calif. Inst. of Tech., Pasadena.
NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY. LONG-RANGE H-F SPIN-SPIN COUPLING IN 1, 1-DIFLUORO-2, 2-DICHLORO-3-PHENYL-3-METHYLCYCLOBUTANE, by Masaaki Takahashi, Donald R. Davis, and John D. Roberts. Technical rept. no. 17 on Contract Nonr-220(26). Feb 62, 10p. 10 refs.

DESCRIPTORS: *Nuclear magnetic resonance, *Microwave spectroscopy, Molecular spectroscopy, Spectroscopy, *Cyclobutanes, Butanes, Methyl radicals, Phenyl radicals, Chlorides, Fluorides, Nuclear spins, Nuclear magnetic moments, Magnetic moments.

A 2 cps long-range H-F spin-spin coupling has been observed over five saturated bonds in 1, 1-difluoro-2, 2-dichloro-3-phenyl-3-methylcyclobutane, involving one of the fluorines at the 1-position and the protons of the 3-methyl group. Comparison of the spectrum with that of a stereospecifically labeled 4-deutero derivative suggests that the fluorine involved in the long-range coupling is the one cis to the methyl group. (Author)

62-RL-2936E $1.60

General Electric Research Lab., Schenectady, N. Y.
NEUTRON YIELDS FROM HIGH-POWER θ-PINCH DEVICE, by H. C. Pollock, L. M. Goldman, and W. F. Westendorp. Feb 62, 13p. 2 refs.

PB 162 379 $1.60

High-Energy Physics Lab., Stanford U., Calif.
MAGNETIC ELASTIC SCATTERING OF ELECTRONS BY LIGHT NUCLEI, by J. Goldemberg and Y. Torizuka. [Rept. on Contract N6onr-251(16)]. Aug 62, 16p. 9 refs. Rept. no. HEPL-269.

DESCRIPTORS: *Electrons, *Elastic scattering, Magnetic moments, Light, Nuclei, Proton cross sections, Nuclear magnetic moments, Photons.

The elastic scattering of 41.5 Mev electrons was measured at ~180° where the charge scattering is very small so magnetic scattering stands out more clearly. Measurements were made for $_1H^1$, $_1D^2$, $_2He^4$, $_3Li^6$, $_3Li^7$, $_4Be^9$, $_5B^{10}$, $_5B^{11}$, $_6C^{12}$, $_7N^{14}$, $_8O^{16}$, $_9F^{19}$, $_{10}Ne^{20}$, $_{11}Na^{23}$, $_{12}Mg$, $_{13}Al^{27}$, $_{15}P^{31}$, $_{18}A^{40}$, $_{19}K^{39}$ and $_{20}Ca^{40}$. It is shown that the results are consistent with calculations based on scattering by the magnetic moment of the nuclei involved. (Author)

PB 162 382 $4.60

High-Energy Physics Lab., Stanford U., Calif.
STUDY OF NUCLEAR MAGNETIC TRANSITIONS BY INELASTIC ELECTRON SCATTERING, by W. C. Barber, J. Goldemberg and others. [Rept. on Contract N6onr-251(16)]. 14 Sep 62, 48p. 30 refs. Rept. no. HEPL-276.

DESCRIPTORS: *Electrons, *Inelastic scattering, Scattering, *Nuclear magnetic moments, Magnetic moments, Dipole moments, Nuclear energy levels, Proton cross sections, Photons, Bremsstrahlung.

The energy spectrum of inelastically scattered electrons at 180° was measured for 41.5 Mev electrons from the Stanford Mark II Linear Accelerator for the following elements: $_1D^2$, $_3Li^6$, $_3Li^7$, $_7N^{14}$, $_8O^{16}$, $_9F^{19}$, $_{10}Ne^{20}$, $_{11}Na^{23}$, $_{12}Mg$, $_{13}Al^{27}$, $_{15}P^{31}$, $_{16}S^{32}$, $_{18}Ar^{40}$, $_{19}K^{39}$, $_{20}Ca^{40}$, and $_{83}Bi^{209}$.

PB 162 377 $1.10

High-Energy Physics Lab., Stanford U., Calif.
UPPER LIMITS OF THE ELECTRIC DIPOLE MOMENT OF THE ELECTRON, by J. Goldemberg and Y. Torizuka. [Rept. on Contract N6onr-251(16)]. 24 Aug 62, 5p. 6 refs. Rept. no. HEPL-268.

DESCRIPTORS: *Electrons, Electric fields, *Dipole moments, Elastic scattering, Differential cross section, Electric dipole transitions, Scattering.

Upper limits on the electric dipole moment of the electron have been established by several methods; the available information is summarized. Mose measurements were made for momentum transfers $q \approx 0$. The elastic scattering cross section of 41.5 Mev electrons on He^4 at 180° which corresponds to $q = 0.44 \times 10^{-13}$cm were measured.

INTERNUC-67 $9.10

Internuclear Co., Clayton, Mo.
MIST(MULTIGROUP INTERNUCLEAR SLAB TRANSPORT), by G. E. Putnam, D. M. Shapiro and others. Rept. on Contract AT(10-1)-205. 18 Aug 61, 105p. 3 refs.

NASA N62-16383 $1.60

Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SOME CALCULATIONS BEARING ON THE USE OF NEUTRON ACTIVATION FOR REMOTE COMPOSITIONAL ANALYSIS, by A. E. Metzger. Rept. on Contract NAS7-100. 5 Aug 62, 12p. 3 refs. Technical rept. no. 32-286.

TID-11164 $1.60

Knolls Atomic Power Lab., Schenectady, N. Y.
THE EFFECT OF ANISOTROPIC NEUTRON SCATTERING ON RADIATION DAMAGE, by P. E. McElligott, K. R. Jordan, and R. J. Allio. 9 Nov 60, 16p. 13 refs.

UCRL-9575 $1.10

Lawrence Radiation Lab., U. of California, Berkeley.
BREMSSTRAHLUNG, by R. W. Kenney. Rept. on Contract W-7405-eng-48. Feb 61, 7p. 2 refs.

UCRL-9465 $2.60

Lawrence Radiation Lab., U. of California, Berkeley.
PHOTOPRODUCTION OF NEUTRAL PIONS AS A FUNCTION OF MASS NUMBER, by John D. Anderson, Lester K. Goodwin and Robert W. Kenney. Rept. on Contract W-7405-eng-48. 4 Nov 60, 29p. 23 refs.

UCRL-10362 $2.00

Lawrence Radiation Lab., U. of California, Berkeley.
PREFERENTIAL POLAR ALPHA-PARTICLE EMISSION IN ORIENTED CALIFORNIUM AND EINSTEINIUM, by Quirino Oli Navarro. Doctoral thesis. Rept. on Contract W-7405-eng-48. 12 July 62, 93p. 63 refs.

LADC-5267 $3.60

Los Alamos Scientific Lab., N. Mex.
SOME RECENT DEVELOPMENTS IN FISSION PHYSICS, by R. B. Leachman. 7 Sep 62, 36p. 21 refs.

MMPP-191-1 $1.50

Michigan Memorial Pheonix, Proj. U. of Michigan, Ann Arbor.
TWO YEARS EXPERIENCE IN APPLYING A LOW COST NEUTRON GENERATOR TO ACTIVATION ANALYSIS, by W. Wayne Meinke and Ronald W. Shideler. Rept. on Contract AT(11-1)70. Dec 61, 63p. 18 refs. TID-14271.

K-1537 $0.75

Oak Ridge Gaseous Diffusion Plant, Tenn.
MACHINE CALCULATION OF CENTRIFUGE EFFICIENCIES, by A. A. Brooks. Rept. on Contract W-7405-eng-26. 21 Sep 62, 27p. 3 refs.

ORNL-3287 $1.00

Oak Ridge National Lab., Tenn.
A MONTE CARLO CALCULATION OF SCATTERED NEUTRON FLUXES AT AN AIR-GROUND INTERFACE DUE TO POINT ISOTROPIC SOURCES ON THE INTERFACE, by W. E. Kinney. Rept. on Contract W-7405-eng-26. [1962] 37p. 10 refs.

IDO-16797 $0.50

Phillips Petroleum Co., Idaho Falls.
RADIOCHEMICALLY DETERMINED RATIOS OF ASYMMETRIC TO SYMMETRIC FISSION OF U^{233}, Pu^{239}, AND U^{235} AS A FUNCTION OF NEUTRON ENERGY, by W. H. Burgus. Rept. on Contract AT(10-1)-205. 30 July 62, 25p. 12 refs. NASA N62-15304.

NYO-9536 $1.60

Rochester U., N. Y.
APPLICATION OF THE PROJECTION THEOREM TO NUCLEI WITH LOW MASS NUMBER, by S. Iwao, F. B. Wand, and S. Morin. Rept. on Contract AT(30-1)-875. 17 Jan 61, 14p. 5 refs.

Elementary Particles

PB 159 784 $1.10

Arizona State U. [Tempe].
OPERANT CONDITIONING OF A CLASS OF WORD ASSOCIATION, by Arthur W. Staats, Carolyn K. Staats, and Karl A. Minke. Technical rept. no. 18 on Psychological Processes in Language Communication, Contract Nonr-2794(02), and National Inst. of Mental Health Contract M-2381. June 61, 10p. 9 refs.

DESCRIPTORS: *Language, Conditioned reflex, *Vocabulary, Behavior, *Reaction (Psychology), Stimulation, *Verbal behavior, Social communication.

This experiment was conducted in order to test the hypothesis that the word associates to a common stimulus word constitute a word class; that is, reinforcing word associates to a word when they are emitted will result in an increase in the frequency of emission of other word associates to the same word. (Author)

ORO-538 $1.60

Florida U., Gainesville.
AN EXPERIMENTAL INVESTIGATION OF ELECTRON TRAJECTORIES IN AN AXIALLY SYMMETRIC MAGNETIC FIELD, by R. F. Stetson, B. N. A. Lamborn, and D. L. Lafferty. Technical rept. no. 3, on Contract AT(40-1)-2783. 15 Mar 62, 11p. 2 refs.

ORO-569 $1.60

Florida U., Gainesville.
PARTICLE TRAJECTORIES IN A STATIC MIRROR FIELD, by D. L. Lafferty and B. N. A. Lamborn. Technical rept. no. 4 on Contract AT(40-1)-2783. 27 June 62, 17p. 1 ref.

PB 162 381 $4.60

High-Energy Physics Lab., Stanford U., Calif.
AN EXPERIMENTAL INVESTIGATION OF PION ELECTROPRODUCTION, by L. N. Hand. [Rept. on Contract N6onr-251(16)]. 27 Aug 62, 48p. 30 refs. Rept. no. HEPL-275.

DESCRIPTORS: *Pions, Mesons, Nuclear reactions, Electrons, Protons, Neutrons, Nuclear resonance, Elastic scattering, Bremsstrahlung.

Measurements of the total cross section for the processes $e + p \rightarrow e' + n + \chi^+$ and $e + p \rightarrow e' + p + \chi^o$ are reported for a wide range of center of mass energies and momentum transfers extending above the first pion nucleon resonance and to momentum transfers of $20\ f^{-2}$. Only the final electron is observed in this experiment.

PB 162 380 $1.60

[High-Energy Physics Lab.] Stanford U., Calif.
LOW-MASS ANOMALY IN PHOTOPRODUCTION OF PION PAIRS, by Burton Richter. [Rept. on Contract N6onr-251(16)]. 20 July 62, 12p. 12 refs. Rept. no. HEPL-270.

DESCRIPTORS: *Pions, Production, *Nuclear reactions, Elastic scattering, Differential cross section, Protons, Electrons, Particles, *Photonuclear reactions, *Pair production.

Abashian, Booth and Crowe have observed an anomaly in the production of pion pairs in the reaction $p + d \rightarrow He^3 + 2\pi$. This anomaly "ABC" occurs in the isotopic spin state $T = 0$ of the two pions or as being caused by the production of some particle. This experiment was an attempt to observe the ABC in the reaction $\gamma + p \rightarrow p +$ ABC, without any restriction on the possible decay modes of the ABC if it is a particle.

PB 159 823 $1.60

Illinois U., Urbana.
INVESTIGATION OF Σ-HYPERON DECAYS, by G. Condo, J. E. Crew and others. Technical rept. no. 24 on Research in Nuclear Physics, Contract [N]onr-1834(05). May 61, 12p. 16 refs.

DESCRIPTORS: *Hyperons, Radioactive decay, Nuclear reactions, Mesons, Protons, Nuclear physics, Particles.

This investigation was undertaken to search for leptonic decays predicted by Feynman and Gell-Mann on the basis of a universal Fermi interaction.

AD-280 790 $1.60

Illinois U., Urbana.
A SURVEY OF NEUTRAL PARTICLES IN A 30° BEAM FROM THE BROOKHAVEN ALTERNATING GRADIENT SYNCHROTRON OPERATING AT 30 BEV, by H. J. Gerber, G. Fisher and others. Technical rept. no. 39 on Research in Nuclear Physics, Contract [N]onr-1834(05). May 62, 17p. 3 refs.

DESCRIPTORS: *Protons, *Proton beams, *Synchrotrons, Gamma ray spectra, Neutrons, Mesons, *Gamma rays, Particles, Particle beams.

There are about $1.6 \pm 0.3 \times 10^9$ gamma rays with energies greater than 1 Bev per steradian at 30° from a 30 Bev proton beam of 10^{11} protons which is making multiple traversals of a carbon (or polyethylene) target. The number of gamma rays with energies greater than 3 Bev is down a factor of 10^3 from the number at 1 Bev. The number of high energy neutrons (greater than 300 Mev) coming through 2 inches of lead is about 5×10^9 neutrons per steradian per 10^{11} protons.

AD-279 115 $2.60

Nevis Cyclotron Lab., Columbia U., Irvington-on-Hudson, N. Y.
MAGNETIC MOMENT OF NEGATIVE MUONS, by J. Menes. Doctoral thesis. Rept. on Contract Nonr-266(72). Feb 62, 29p. 21 refs. Rept. no. R-315; CU-208; Nevis-101.

DESCRIPTORS: *Muons, Mesons, *Nuclear magnetic moments, Magnetic moments, Carbon, Oxygen, Magnesium, Silicon, Sulfur

The magnetic moment of negative muons bound in atoms of carbon, oxygen (in water), magnesium, silicon and sulfur has been measured with a precision ranging from 3×10^{-5} in carbon to 1.6×10^{-4} in sulfur. The measured moment is corrected for relativistic effects, diamagnetism, nuclear polarization and, in the case of carbon and magnesium, Knight shift before being compared to the moment of the positive muon. The two moments are found to be equal to 3×10^{-4}, where the major uncertainty is due to Knight shift. The relativistic, diamagnetic, nuclear and solid state shifts are large enough compared to the statistical and systematic errors to make this technique usable for the investigation of these effects. (Author)

Instruments and Installations

BNL-6242 $1.60

Brookhaven National Lab., Upton, N. Y.
SPARK-CHAMBER LABELING OF TRACKS IN A BUBBLE CHAMBER, by J. Fischer and G. T. Zorn. 6 Sep 62, 15p. 11 refs.

CEX-59.4(Pt. II) $1.50

Edgerton, Germeshausen and Grier, Inc., Santa Barbara, Calif.
AERIAL RADIOLOGICAL MONITORING SYSTEM. II. PERFORMANCE, CALIBRATION, AND OPERATIONAL CHECK-OUT OF THE EG&G ARMS-II REVISED SYSTEM, by J. E. Hand, R. B. Guillou, and H. M. Borella. Rept. on Contract [AT(29-1)1183]. 1 Oct 62, 66p. 16 refs.

UCRL-9231 $5.60

Lawrence Radiation Lab., U. of California, Berkeley.
AUTOMATIC SCANNING AND MEASURING OF BUBBLE CHAMBER PHOTOGRAPHS, by Antonio Grasselli. Rept. on Contract W-7405-eng-48. 1 June 60, 60p. 7 refs.

UCRL-10069 $1.10

Lawrence Radiation Lab., U. of California, Berkeley.
METAL GASKETS FOR THE BERKELEY 88-INCH CYCLOTRON, by Ralph Peters. Rept. on Contract W-7405-eng-48. 27 Apr 62, 10p.

UCRL-9435 $2.60

Lawrence Radiation Lab., U. of California, Berkeley.
THE RCA 6949 AS A SELF-EXCITED CYCLOTRON OSCILLATOR, by Bob H. Smith. Rept. on Contract W-7405-eng-48. 25 Oct 60, 22p. 9 refs.

UCRL-6325 $2.60

Lawrence Radiation Lab., U. of California, Berkeley.
SOME EXPERIENCES WITH NOBLE-METAL METAL-SHEATHED THERMOCOUPLES, by William E. Bostwick. Rept. on Contract W-7405-eng-48. 6 Feb 61, 25p. 17 refs.

UCRL-9413 $1.10

Lawrence Radiation Lab., U. of California, Berkeley.
THE STATISTICAL GEOMETRY OF BUBBLE TRACKS, by Walter H. Barkas. Rept. on Contract W-7405-eng-48. 28 Sep 60, 8p. 5 refs.

ORNL-1383 $3.60

Oak Ridge National Lab., Tenn.
ELECTROMAGNETIC RESEARCH DIVISION, ed. by F. T. Howard. Quarterly progress rept. for period ending 30 Sep 52, on Contract W-7405-eng-26. [1962] Declassified 2 Apr 62. 32p. 9 refs.

ORNL-1531 $2.60

Oak Ridge National Lab., Tenn.
ELECTROMAGNETIC RESEARCH DIVISION. Semi-annual progress rept. for period ending 20 Mar 53, on Contract W-7405-eng-26. 8 June 53, declassified 2 Apr 62. 28p. 33 refs.

WCAP-2053 $1.60

Westinghouse Electric Corp., Pittsburgh, Pa.
MINIATURE NEUTRON DETECTOR DEVELOPMENT, ed. by J. Weisman. Quarterly progress rept. 1 Apr-30 June 62, on Contract AT(30-1)-2827. 18p.

Nuclear Engineering and Power

APAE-112(Vol. III) $1.75

Alco Products, Inc., Schenectady, N. Y.
30 MEGAWATT HEAT EXCHANGER AND STEAM GENERATOR FOR SODIUM COOLED REACTOR SYSTEM. VOLUME III. MATERIAL AND WELDING SPECIFICATIONS. Rept. on Contract AT(11-1)666. 29 June 62, 58p.

ACNP-62016 $10.50

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
SHIELDING ANALYSIS, by R. J. Holl and D. W. Stephen. Rept. for Northern States Power Co. and Central Utilities Atomic Power Associates on Contract AT(11-1)-589. 15 July 62, 137p. 10 refs.

AMF-388-TR-1 $2.75

AMF Atomics, Inc., Greenwich, Conn.
COMPONENT FEASIBILITY TEST REPORT FOR THE AMF ON-POWER REFUELING SYSTEM FOR THE DOUGLAS POINT PLANT. Rept. on Contract AT(38-1)233. Feb 62, 157p.

ANL-FGF-218 $2.60

Argonne National Lab., Ill.
THE ASSEMBLY, SODIUM BONDING AND INSPECTION OF EBR-II BLANKET RODS, by R. L. Salley and C. H. Bean. Dec 60, 23p.

ANL-6428 $0.50

Argonne National Lab., Ill.
THE EFFECTS OF IRRADIATION ON SOME BINARY ALLOYS OF THORIUM-PLUTONIUM AND ZIRCONIUM-PLUTONIUM, by J. A. Horak, J. H. Kittel, and H. V. Rhude. Rept. on Contract W-31-109-eng-38. July 62, 17p. 11 refs.

ANL-6414 $0.75

Argonne National Lab., Ill.
NONDESTRUCTIVE TESTING BY ELECTROMAGNETIC METHODS, by C. J. Renken. Progress rept. on Contract W-31-109-eng-38. July 62, 27p. 5 refs. NASA N62-16385.

ANL-6610 $2.00

Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM. Progress rept. for Aug 62 on Contract W-31-109-eng-38. 15 Sep 62, 78p 25 refs.

ARF-8262-2 $5.60

Armour Research Foundation, Chicago, Ill.
STUDIES OF REACTOR CONTAINMENT STRUCTURES, by N. A. Weil, R. L. Chiapetta and others. Monthly progress rept. July-Aug 62, on Contract AT(11-1)-578. 14 Sep 62, 60p.

NAA-SR-7432 $0.75

Atomics International, Canoga Park, Calif.
SNAP SHIELD TEST EXPERIMENT FISSION-PLATE POWER CALIBRATION, by R. L. Tomlinson. Rept. on Contract AT(11-1)-GEN-8. 15 Aug 62, 35p. 17 refs.

BAW-1259 $2.00

Babcock and Wilcox Co., Lynchburg, Va.
SPECTRAL SHIFT CONTROL REACTOR BASIC PHYSICS PROGRAM. Quarterly technical rept. no. 7, Apr-June 62, on Contract AT(30-1)-2602. [1962] 76p. 24 refs.

BMI-APDA-660 $9.60

Battelle Memorial Inst., Columbus, Ohio.
IRRADIATION STUDIES OF URANIUM-10 W/O MOLYBDENUM FUEL ALLOY, by John E. Gates, William E. Murr and others. 26 Jan 61, 119p.

BMI-1594 $2.50

Battelle Memorial Inst., Columbus, Ohio.
JOINING ZIRCALOY-STAINLESS STEEL AND SAP ALLOYS BY FRICTION, ROLLING, AND EXPLOSIVE TECHNIQUES, ed. by Stan J. Paprocki and Stanley W. Porembka. Rept. on Contract W-7405-eng-92. 4 Sep 62, 121p. 5 refs.

WAPD-T-1468 (rev.) $1.60

Bettis Atomic Power Lab., Pittsburgh, Pa.
U^{235} FISSION-PRODUCT POISON EXPERIMENTS, by S. B. Gunst, J. C. Connor and others. Rept. on Contract AT(11-1)-GEN-14. June 62, 15p. 5 refs.

BRB-61 $3.60

Bridgeport Brass Co., Conn.
DYNAPAK EXTRUSION OF '0' SIZE I+E CORES, by P. W. Miller and L. Lewis. Rept. on Contract AT(30-1)-1405. 3 July 61, declassified 15 Nov 62. 36p. 4 refs.

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DYNAPAK EXTRUSION OF THIN AND THICK WALLED NATURAL URANIUM TUBING, by L. Lewis. Rept. on Contract AT(30-1)-1405. 26 Oct 60, declassified 15 Nov 62. 60p. 2 refs.

CEND-155 $1.25

Combustion Engineering, Inc., Windsor, Conn.
ABWR DESIGN AND DEVELOPMENT. Quarterly progress rept. 1 Jan-31 Mar 62 on Contract AT(11-1)1062. 15 Apr 62, 56p.

CEND-119 $2.60

Combustion Engineering, Inc., Windsor Conn.
VIBRATORY COMPACTION OF DOUBLE ANNULAR FUEL ELEMENTS FOR NUSU CRITICAL EXPERIMENT. Rept. on Contract AT(11-1)-795. Feb 61, declassified 5 Sep 62. 29p.

DP-765 $0.75

du Pont de Nemours, E. I., and Co., Wilmington, Del.
HEAVY WATER MODERATED POWER REACTORS, comp. by R. R. Hood and L. Isakoff. Progress report, July 62, on Contract AT(07-2)-1. Aug 62, 30p. 12 refs. NASA N62-15703.

NYO-10094 $2.60

Dynatech Corp., Cambridge, Mass.
EVALUATION OF AUTOMATIC FLOW BALANCING DEVICE IN BOILING WATER REACTORS, by R. L. Mela, R. Moissis and others. Quarterly progress rept. Mar-Aug 62, on Contract AT(30-1)-2907. 1 Aug 62, 32p. 4 refs. Rept. no. 325.

GA-3132 $2.00

General Atomic Div., General Dynamics Corp., San Diego, Calif.
40-MW(E) PROTOTYPE HIGH-TEMPERATURE GAS-COOLED REACTOR RESEARCH AND DEVELOPMENT PROGRAM. Quarterly progress rept. for the period ending 31 Mar 62, on Contract AT(04-3)314. Sep 62, 84p. 28 refs.

GA-2827 $0.50

General Atomic Div., General Dynamics Corp., San Diego, Calif.
DEVELOPMENT AND EVALUATION OF B_4C - GRAPHITE CONTROL-ROD MATERIALS FOR THE HTGR, by W. V. Goeddel. Rept. on Contract AT(04-3)-314. 4 Apr 62, 22p. 6 refs.

GEAP-3882 $2.25

General Electric Co., San Jose, Calif.
AEC SUPERHEAT CRITICALS. A COMPARISON OF EXPERIMENT AND THEORY ON UNIFORM LATTICES, by G. T. Petersen and F. G. Warzek. Rept. on Contract AT(04-3)189. Jan 62, 107p. 11 refs.

GEAP-4016 $3.50

General Electric Co., San Jose, Calif.
CONCEPTUAL DESIGN FOR A 75 MWe MIXED SPECTRUM SUPERHEATING REACTOR POWER PLANT, by G. V. Brynsvold, K. Hikido and others. Rept. on Contract AT(04-3)189. 25 Feb 62, 261p.

GEAP-3877 $3.00

General Electric Co., San Jose, Calif.
NUCLEAR SUPERHEAT PROJECT, by R. T. Pennington. Quarterly progress rept. no. 9, Uly-Sep 61 on Contract AT (04-3)189. June 61, 202p.

HW-73701(Rev.) $0.75

Hanford Atomic Products Operation, Richland, Wash.
IN-REACTOR MONITORING OF ZIRCALOY-2 PRTR PRESSURE TUBES, PART I, by D. R. Doman and P. J. Pankaskie. Rept. for period Sep 60-May 62, on Contract AT(45-1)-1350. May 62, 27p. 3 refs.

HW-SA-2080 $1.10

Hanford Atomic Products Operation, Richland, Wash.
INHIBITION STUDIES IN REACTOR DECONTAMINANTS, by R. D. Weed. [1961] 9p. 2 refs.

HW-66182 $1.60

Hanford Atomic Products Operation, Richland, Wash.
PCTR MEASUREMENTS OF THE EGCR LATTICE PARAMETERS WITH 2.6 w/o ENRICHED UO_2 FUEL, by J. R. Worden and P. F. Nichols. Preliminary rept. on Contract W-31-109-eng-52. 12 Aug 60, 14p. 2 refs.

HW-71319(Rev) $1.00

Hanford Atomic Products Operation, Richland, Wash.
SPECIAL RADIOISOTOPES FOR POWER: AVAILABILITY AND APPLICATIONS OF THORIUM-230 (IONIUM) FROM URANIUM ORE MILLS, by C. A. Rohrmann. Rept. on Contract AT(45-1)-1350. 16 Oct 61, 39p. 20 refs.

NYO-9786 $15.50

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
SURVEY OF COMPONENT REQUIREMENTS AND AVAILABILITY FOR GAS-COOLED NUCLEAR REACTOR POWER PLANTS. COOLANTS, by Zenons Zudans and John A. Goff. Interim rept. on Contract AT(30-1)-2512. Aug 61, 240p. 59 refs. I-A2392-1.

UCRL-6923 $0.75

Lawrence Radiation Lab., U. of California, Livermore.
THE PLUTO PROGRAM, by Harry L. Reynolds. Rept. on Contract W-7405-eng-48. 17 May 62, 23p. 6 refs. NASA N62-16957.

LA-2737 $1.00

Los Alamos Scientific Lab., N. Mex.
FABRICATION OF BORAL CONTROL PLATES FOR KIWI REACTORS, by R. W. Keil and G. S. Hanks. Rept. on Contract W-7405-eng-36. 20 Sep 62, 38p. NASA N62-16232.

LAMS-2753 $0.50

Los Alamos Scientific Lab., N. Mex.
LAMPRE PROGRAM. Quarterly status rept. for period ending 20 Aug 62 on Contract W-7405-eng-36. 28 Sep 62, 18p.

LAMS-2744 $0.75

Los Alamos Scientific Lab., N. Mex.
REFLECTOR SAVINGS OF MODERATING MATERIALS ON LARGE DIAMETER U(93.2%) SLABS, by G. E. Hansen, D. P. Wood, and B. Pena. Rept. on Contract W-7405-eng-36. 8 Oct 62, 26p.

MND-MD-2543 $10.10

Martin [Marietta Corp.] Baltimore, Md.
PM RESEARCH AND DEVELOPMENT. TASK 1.0—CORE 2 REFERENCE DESIGN REPORT, by T. Cox, K. Ellingsworth, and R. Lightner. Rept. on Contract AT(30-1)-2706. Aug 62, 123p. 24 refs.

MLM-1125 $2.60

Mound Lab., Miamisburg, Ohio.
MOUND LABORATORY MONTHLY PROGRESS REPORT FOR OCTOBER 1961, by J. F. Eichelberger. Rept. on Contract AT(33-1)-GEN-53. 31 Oct 61, 27p. NASA N62-14835.

NMI-7218-1 $3.60

Nuclear Metals, Inc., Concord, Mass.
EVALUATION OF FIFTEEN INNER TUBES OF ZIRCALOY-CLAD UNALLOYED URANIUM FOR THE HWCTR. INNER TUBES NOS. 3 AND 5 THROUGH 18, by A. B. Bremer. 15 Aug 62, 40p. 3 refs.

ORNL-3248 $2.25

Oak Ridge National Lab., Tenn.
HEALTH PHYSICS RESEARCH REACTOR HAZARDS SUMMARY, by M. I. Lundin. Rept. on Contract W-7405-eng-26. [1962] 99p. 12 refs.

ORNL-3313 $3.50

Oak Ridge National Lab., Tenn.
METALS AND CERAMICS DIVISION. Annual progress rept. for period ending 31 May 62, on Contract W-7405-eng-26. [1962] 241p. 132 refs.

ORNL-3319 $2.00

Oak Ridge National Lab., Tenn.
NUCLEAR SAFETY PROGRAM. Semiannual progress rept. for period ending 30 June 62, on Contract W-7405-eng-26. [1962] 78p. 33 refs.

DP-760 $0.50

Savannah River Lab., Aiken, S. C.
GAUGE FOR MEASURING BOW OF TUBES, by G. B. Alewine. Report on Contract AT(07-2)-1. Aug 62, 7p. NASA N62-16973.

DP-761 $0.50

Savannah River Lab., Aiken, S. C.
GAUGE FOR MEASURING WALL THICKNESS OF IRRADIATED TUBULAR ELEMENTS, by G. Brooks Cole. Rept. on Contract AT(07-2)-1. Aug 62, 7p. 1 ref.

DP-764 $0.50

Savannah River Lab., Aiken, S. C.
A VIBRATORY POLISHER FOR REMOTE METALLOGRAPHY, by Carlton K. Nicholson and Clifton L. Williamson. Rept. on Contract AT(07-2)-1. Aug 62, 9p. 2 refs.

NYO-2680 $3.00

[Technical Research Group] Syosset, N. Y.
HETEROGENEOUS REACTOR CALCULATION METHODS, by Carl N. Klahr, Lawrence B. Mendelsohn, and Jerome Heitner. Final rept. 1 Apr 59-30 June 61, on Contract AT(30-1)-2375. 30 June 61, 226p. 32 refs. TRG-129-FR

UNC-3006 $2.00

United Nuclear Corp., New Haven, Conn.
LOW TEMPERATURE SINTERING OF URANIUM DIOXIDE, by N. Fuhrman, L. D. Hower, Jr. and R. B. Holden. Final rept. 15 Apr 59-31 Dec 61 on Process Development, Contract AT(30-1)2374. 1 Mar 62, 84p. 19 refs.

NDA-2153-3 $9.60

[United Nuclear Corp.] White Plains, N. Y.
CIVILIAN POWER REACTOR PROGRAM. PART III. LARGE (100 AND 300 MWe) HEAVY WATER-MODERATED POWER REACTORS, comp. by J. H. Hutton, S. A. Davis and others. Status rept. as of 1960 on Contract AT(30-1)-2303 (XIV). 19 Aug 60, 107p. 61 refs.

NYO-10469 $2.60

Westinghouse Electric Corp., Cheswick, Pa.
STUDY OF BONDING BETWEEN UO_2 AND SEVERAL CLAD MATERIALS. Final rept. on Contract AT(30-1)-2176. 13 Aug 62, 23p. 7 refs.

CVNA-152 $9.10

Westinghouse Electric Corp., Pittsburgh, Pa.
RELATIVE THERMAL EXPANSION OF UO_2 FUEL INPILE, by William E. Baily. Terminal rept. on Contract AT(30-1)-2289. June 62, 105p. 30 refs.

Nuclear Reactions

TID-11967 $1.10

Argonne National Lab., Ill.
NEUTRON CAPTURE CROSS-SECTION OF 36 HR Rh^{105}, by J. G. Cuninghame, L. E. Glendenin, and A. L. Harkness. Nov 60, 2p.

UCRL-5518 $1.60

Lawrence Radiation Lab., U. of California, Livermore.
ELASTIC AND INELASTIC SCATTERING OF 14-Mev NEUTRONS FROM THE LITHIUM ISOTOPES, by Calvin Wong, John D. Anderson and others. Rept. on Contract W-7405-eng-48. Mar 59, declassified 15 Nov 62. 14p. 3 refs.

UCRL-10234 $1.10

Lawrence Radiation Lab., U. of California, Berkeley.
K^- -p CHARGE EXCHANGE AT 1.22 GeV/c, by Massimiliano Ferro-Luzzi, Frank T. Solmitz, and M. Lynn Stevenson. Rept. on Contract W-7405-eng-48. 6 June 62, 8p. 1 ref.

UCRL-10233 $1.60

Lawrence Radiation Lab., U. of California, Berkeley.
STUDY OF RESONANCES IN THE $\Sigma - \pi$ SYSTEM, by Margaret H. Alston, Luis W. Alvarez and others. Rept. on Contract W-7405-eng-48. 12 June 62, 14p. 7 refs.

LA-1589 $1.60

Los Alamos Scientific Lab., N. Mex.
YIELD AND ENERGY DISTRIBUTION OF NEUTRONS RESULTING FROM THE INTERACTION OF 14-Mev NEUTRONS WITH Li^6 AND Li^7, by F. L. Ribe. Rept. on Contract W7405-eng-36. Sep 53, declassified 16 Nov 62. 17p. LADC-1644.

Radioactivity

HW-SA-2617 $1.60

Hanford Atomic Products Operation, Richland, Wash.
EVALUATION OF SKIN DOSE FROM PARTICULATE CONTAMINATION, by B. V. Andersen. 5 July 62, 13p. 3 refs.

HASL-131 $3.50

Health and Safety Lab., Atomic Energy Commission, New York.
FALLOUT PROGRAM, by Edward P. Hardy, Jr., Joseph Rivera, and William R. Collins, Jr. Quarterly summary rept., 1 June-1 Sep 62. 1 Oct 62, 249p. 56 refs.

UCRL-9524 $2.60

Lawrence Radiation Lab., U. of California, Berkeley.
DECAY-ENERGY SYSTEMATICS OF THE HEAVY ELEMENTS, by Isadore Perlman and Frank Asaro. Rept. on Contract W-7405-eng-48. 17 Jan 61, 30p. 2 refs.

Waste Disposal

HW-69263 $1.10

Hanford Atomic Products Operation, Richland, Wash.
Cs137 LOADING AND LEACHING OF SYNTHETIC ZEOLITE AND CLINOPTILOLITE COLUMNS, by L. L. Ames, Jr. and J. L. Nelson. Rept. on Contract AT(45-1)-1350. 12 Apr 61, 9p. 5 refs.

HW-70874 $1.60

Hanford Atomic Products Operation, Richland, Wash.
RECOVERY OF CESIUM FROM PUREX TANK FARM SUPERNATANT SOLUTION BY FERROCYANIDE PRECIPITATION AND ABSORPTION ON DECALSO, by H. H. Van Tuyl and L. A. Bray. 18 Oct 61, 12p. 5 refs.

HW-73972 $1.60

Hanford Atomic Products Operation, Richland, Wash.
THE SEQUENTIAL SEPARATION AND DETERMINATION OF ARSENIC-76 AND PHOSPHOROUS-32 IN REACTOR EFFLUENT WATER, by W. C. Johnson, Jr. Rept. on Contract AT(45-1)-1350. 12 June 62, 13p. 4 refs.

NYO-4815 $8.10

Harvard School of Public Health, Boston, Mass.
EVALUATION OF PROPOSED KRYPTON-XENON ADSORPTION SYSTEM DESIGNS FOR THE PL-2 REACTOR, by George C. Krusen II and Leslie Silverman. Rept. on Contract AT(30-1)-841. 3 Aug 62, 88p. 28 refs.

TID-16466 $2.00

Institute of Marine Resources, U. of California, La Jolla.
THE STUDY OF THE BEHAVIOR AND SIGNIFICANCE OF CERTAIN RADIOACTIVE ISOTOPES FOUND IN THE SEWAGE TREATMENT PLANTS OF SELECTED CITIES. PART A: COMPARISON OF THE HYPERION PLANT OF THE CITY OF LOS ANGELES WITH ELEVEN OTHER TREATMENT PLANTS, by T. R. Folson and G. J. Mohanrao. Summary rept. 1960-1961, on Contract AT(11-1)-34. 3 Dec 61, 85p. 46 refs. IMR-TR-922-62-A.

ORNL-2971(Vol. 5) $3.00

Oak Ridge National Lab., Tenn.
BIBLIOGRAPHY ON NUCLEAR REACTOR FUEL REPROCESSING AND WASTE DISPOSAL. VOLUME 5. PLANTS AND EQUIPMENT, by T. F. Connolly. Rept. on Contract W7405-eng-26. [1962] 207p.

PHYSICS

LA-2719 $1.00

Lawrence Radiation Lab., U. of California, Livermore.
HYDROGEN TRANSPORT PROPERTY CORRELATIONS. PART II, by J. D. Rogers, R. K. Zeigler, and Paul McWilliams. Rept. on Contract W-7405-eng-36. 17 Sep 62, 39p. 10 refs. NASA N62-16081.

UCRL-9318 $1.00

Lawrence Radiation Lab., U. of California, Berkeley.
LECTURES ON SUPERCONDUCTIVITY BY ANDREW M. SESSLER AT THE UNIVERSITY OF CALIFORNIA DURING THE SPRING SEMESTER, 1960. Notes by John M. Cornwall. Rept. on Contract W-7405-eng-48. June 60, 42p. 15 refs.

LADC-5378 $1.10

Los Alamos Scientific Lab., N. Mex.
A PROPOSAL FOR AN INTERNATIONAL HELIUM-3 VAPOR PRESSURE SCALE OF TEMPERATURES, by S. G. Sydoriak, T. R. Roberts, and R. H. Sherman. 21 Aug 62, 10p.

AD-281 076 $1.60

Massachusetts U., Amherst.
THE SCATTERING OF LIGHT BY HETEROGENEOUS SPHERES, by R. S. Stein, P. R. Wilson, and S. N. Stidham. ONR Technical rept. no. 42 on Contract Nonr-3357(00). 15 Jan 62, 19p. 8 refs.

DESCRIPTORS: *Light, *Scattering, *Spheres, Refractive index, Plastic films, Optics, Intensity, Density, Mathematical analysis, Statistical functions, Probability, Integrals.

A theory of scattering for spheres with internal structure is presented. While the structure in actual spherulites has been shown to arise principally from fluctuations in the orientation of anisotropic constituents, the case first worked out here is the simpler one for heterogeneity in density.

SC-4642(RR) $1.25

Sandia Corp., Albuquerque, N. Mex.
STRESS PULSE-TRAINS FROM MULTIPLE REFLECTION AT A ZONE OF MANY DISCONTINUITIES. A NOTATION FOR MACHINE SOLUTION, by R. P. Reed. Aug 62, 54p. NASA N62-16396.

Molecular Physics and Spectroscopy

BNL-4948 $1.60

Brookhaven National Lab., Upton, N. Y.
FORCES IN MOLECULES. III. POLYATOMIC MOLECULES, by William L. Clinton. [1959] 15p. 7 refs.

UCRL-6727-T $1.60

Lawrence Radiation Lab., U. of California, Livermore.
ENHANCEMENT OF SIGNAL-TO-NOISE RATIO BY CONTINUOUS AVERAGING, by Melvin P. Klein and George W. Barton, Jr. Rept. on Contract W-7405-eng-48 1 June 62, 14p. 9 refs.

Solid State Physics

AD-260 626 $4.60

[Electron Device Lab.] Ohio State U. Research Foundation, Columbus.
PROPERTIES OF THE OXIDE FILM OF SILICON. SIMULTANEOUS DIFFUSION OF ANTIMONY AND BORON INTO SILICON IN A CLOSED BOX WITH AN OXIDIZING ATMOSPHERE, by M. O. Thurston, T. E. Luke, and Joseph Tsai. Quarterly rept. no. 1, 1 Jan-31 Mar 61, on Diffusion of Impurities into Silicon Through an Oxide Layer, Contract DA 36-039-sc-87426. 30 Apr 61, 49p. 21 refs. Rept. no. RF 1233-1.

DESCRIPTORS: *Silicon, Silicon compounds, Dioxides, Oxides, Chemical impurities, Diffusion, Films, *Thin films, Capacitors, Preparation, *Antimony, *Boron, Ions, Complex ions, Temperature, Mathematical analysis, Theory, Solid state physics, *Semiconductors. The simultaneous diffusion of antimony and boron to produce n-p-n double diffused layers for two source strengths has been studied. The bakeout time phenomenon for boron under simultaneous diffusion was also observed. This confirms the early experimental observations when boron was diffused alone. Experimental results indicate that the boron diffused layer thickness will not be influenced appreciably by antimony impurities, while the antimony diffused layer will be influenced. This indicates that impurity ion interaction is present during diffusion. It is suggested that the reduction of the antimony diffused layer thickness may be due to complex ion formations while the reduction of the boron diffused layer thickness may be due to the electrical force associated with the impurity concentration gradients.

HW-SA-2538 $1.60

Hanford Atomic Products Operation, Richland, Wash.
DIFFRACTION EFFECTS FROM IRRADIATED ALUMINUM SINGLE CRYSTALS, by H. E. Kissinger. Rept. on Contract AT(45-1)-1350. 20 Aug 62, 16p. 8 refs.

NYO-10362 $1.60

James Forrestal Research Center, Princeton, N. J.
THE EFFECT OF DISLOCATIONS ON DIFFUSION IN GERMANIUM, by J. N. Hobstetter (U. of Pennsylvania). Final rept. on Contract AT(30-1)-2331. Aug 62, 15p. 12 refs.

PB 159 813 $4.60

Metals Research Lab., Carnegie Inst. of Tech., Pittsburgh, Pa.
THEORY OF DISLOCATION MOBILITY IN PURE SLIP, by Jens Lothe. Technical rept. on Contract Nonr-760(08). [1961] 44p. 18 refs.

DESCRIPTORS: *Metal crystals, Dislocations, Vibration, Drag, *Phonons, Thermal conductivity, Elasticity.

The mobility during glide of uniformly moving dislocations or dislocation segments supposed not to be obstructed by any Peierl's barrier is estimated. It is shown that the energy dissipation associated with the strong anharmonicities in the core misfit plane is negligible. For a straight freely moving dislocation, the thermoelastic (edge dislocation) and the phonon viscosity effect give rise to a drag stress at ordinary temperatures. In metals the thermoelastic effect is negligible, while the phonon viscosity effect will be of the same order of magnitude as in insulators. The scattering of phonons by the dislocation also causes a drag stress at ordinary temperatures.

SC-4709(RR) $7.60

Sandia Corp., Albuquerque, N. Mex.
OXIDE FILM KINETICS, by A. T. Fromhold, Jr. July 62, 79p. 170 refs.

NASA N62-10878 $1.60

William Marsh Rice U., Houston, Tex.
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